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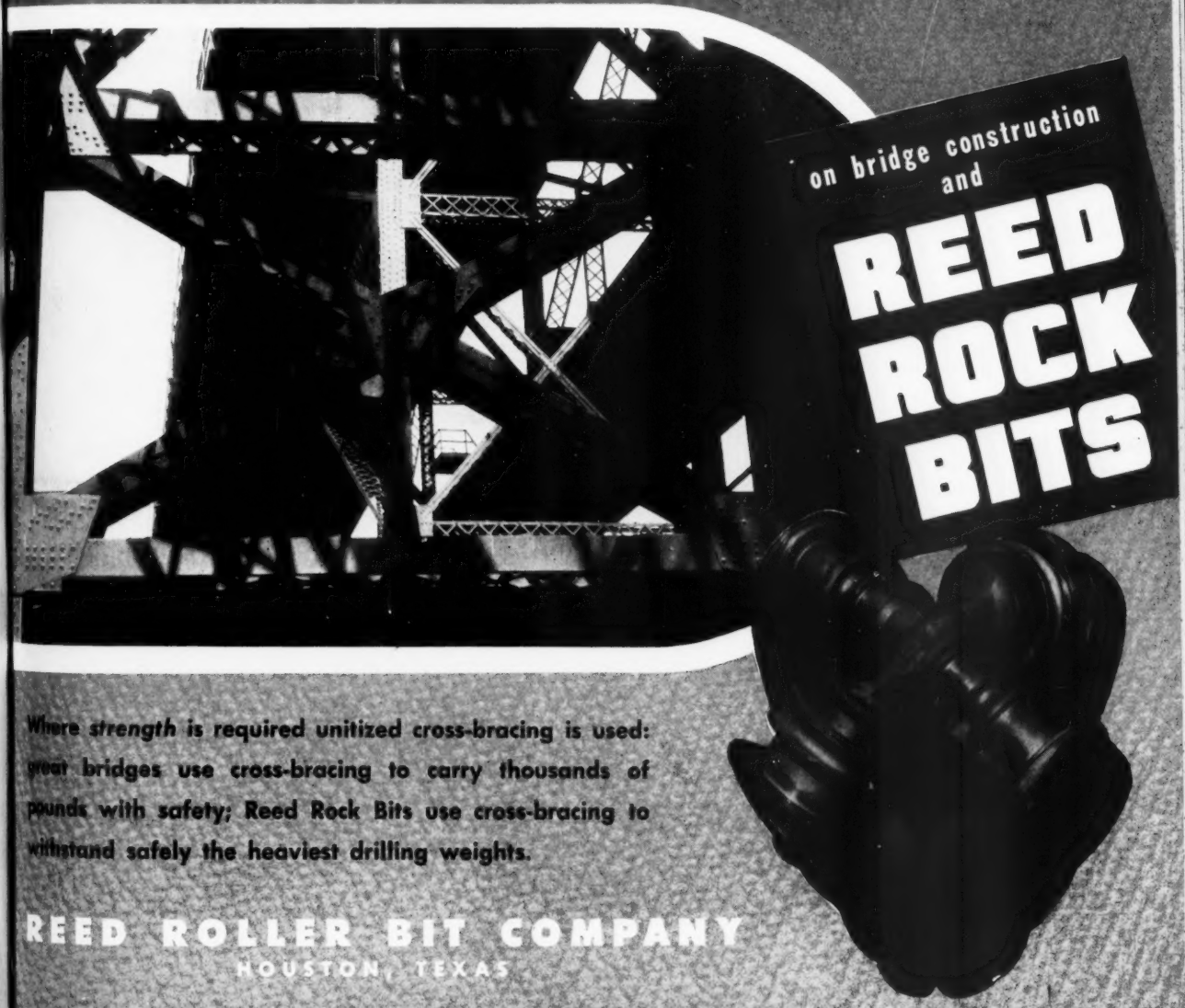

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JUNE 7, 1947

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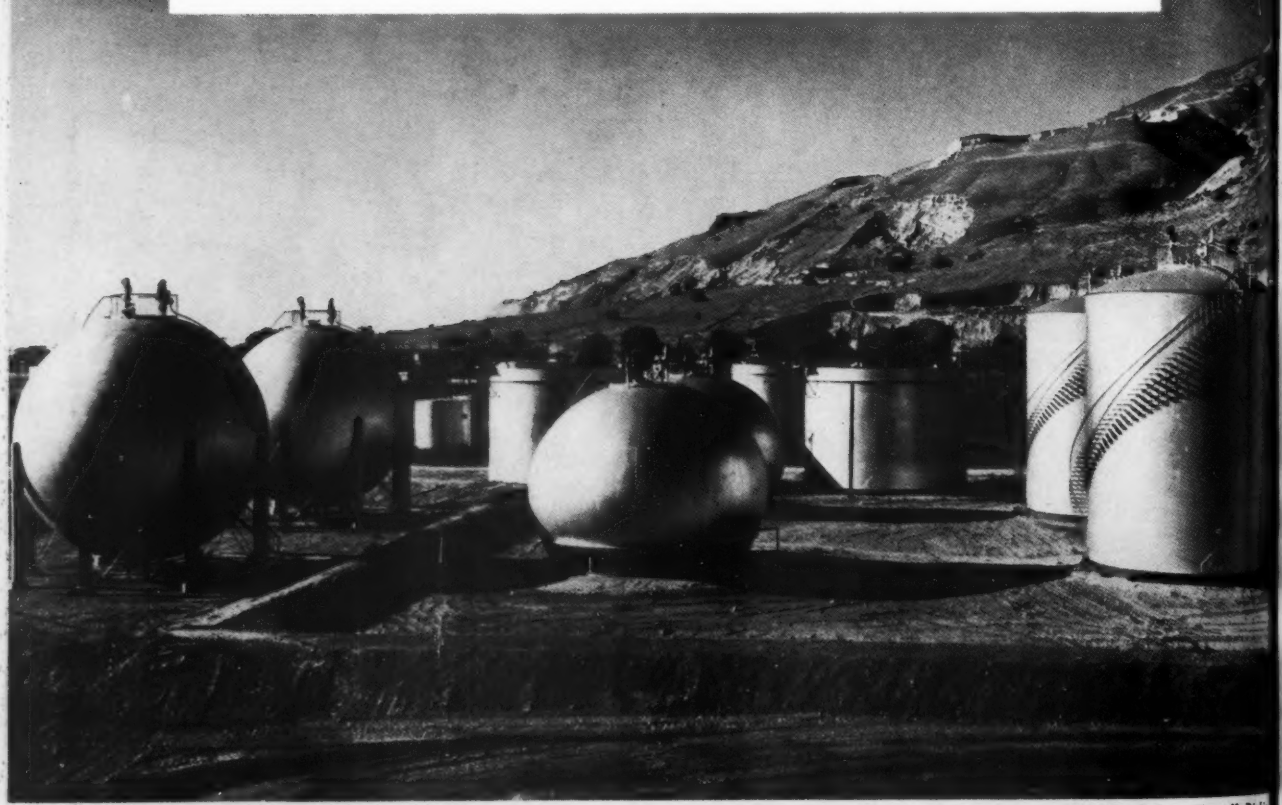

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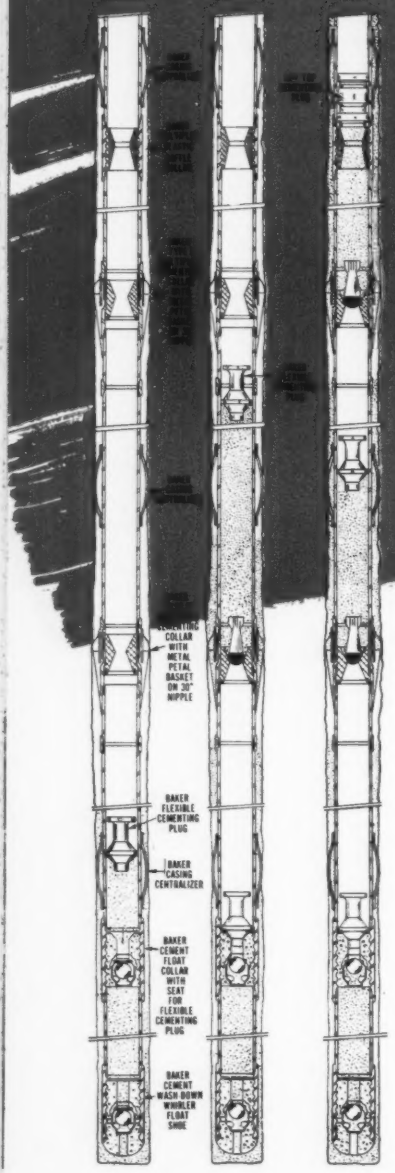
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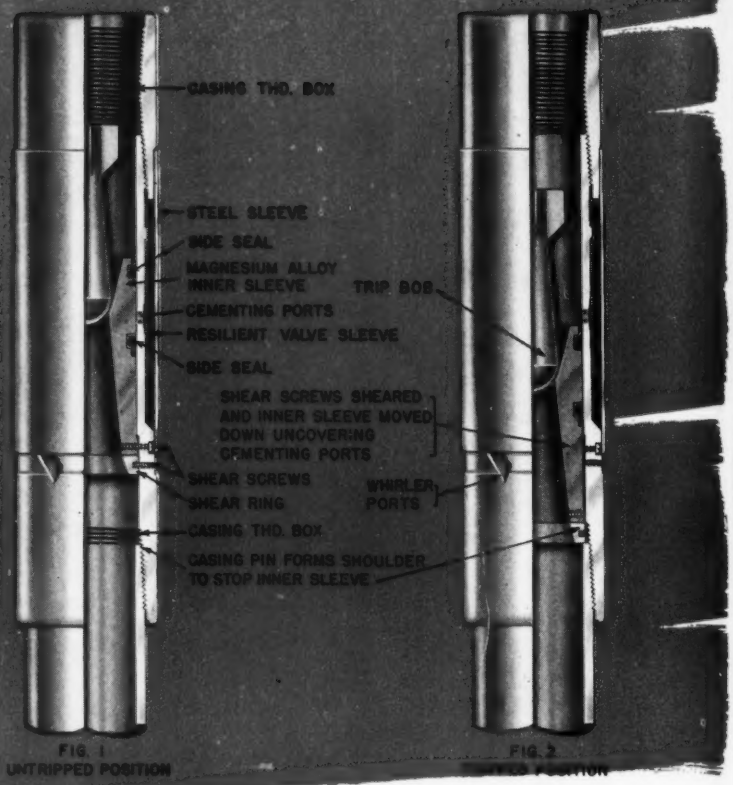

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Industrial Responsibility

A READER points out that our trend charts show that domestic crude-oil producers have increased their field output 500,000 bbl. daily since the start of the year while refinery crude runs to stills are less than they were in early January. He indicates that refiners as a group "may be lying down on the job," and he further intimates that this development in refinery operations may be part of a program permanently to increase imports of finished petroleum products into this country from outside refineries.

All of which reflects how misleading a few figures can be if those using them do not have a background of industrial facts.

Producers, with the assistance of state conservation bodies in the form of increased allowables, have expanded their production of crude oil steadily for many weeks and their output has passed the goal of 5 million barrels daily. This has been possible only through the full cooperation of those in charge of transportation, including the costly use of tank cars where necessary to supplement pipe-line and water movements.

As to refiners the charts reveal that domestic operators expanded their runs to nearly 5 million barrels daily in March. Since that time several plants have been shut down by strikes. The curtailment in the national output of petroleum products has been as high as 200,000 bbl. daily.

For years it has been the policy of important units of the petroleum industry to discourage publicity in regard to labor disputes. We wonder if an entirely different policy is not mandatory in the light of new conditions. Because of management's silence there is no general realization, even within the oil industry, that in most cases recent refinery strikes did not arise from unsuccessful bargaining as to wages and employment conditions, but were the result of insistence on national contracts and other extraneous matters by union leaders. Every effort has been made to obscure the fact that refinery workers are and have been for many years the highest-paid industrial workers.

The American Petroleum Institute is to be congratulated for its action at its meeting in St. Louis this week, in revealing losses in refinery production so far this year, due to strikes. These losses amount to 12 million barrels, or approximately a half billion gallons. These figures should be interpreted to the consumer in terms of gasoline, fuel oil, and other products with which he is familiar.

A great deal has been said about the responsibilities of management in this adjustment period. Part of that duty is to keep the public fully informed as to matters which directly affect its welfare and nothing is more outstanding in that regard than petroleum.

Senate Committee Begins Hearings On Anglo-American Oil Treaty

WASHINGTON. — Consideration of the long-pending Anglo-American petroleum treaty was begun this week by the Senate committee on foreign relations with indications that the committee is quite suspicious of the document and will give serious consideration to objections of independent oil interests.

State Department spokesmen were questioned closely on the origin, necessity, interpretation, and effects of the treaty, and particularly about fears of independents that it may lay the basis for federal control of production.

Opening witness was Undersecretary of State Dean Acheson, who explained that most of the world's oil aside from the United States and Russia is produced in countries which are not large consumers and most of it by U. S. and British capital which have some joint production operations but are mainly rivals throughout the world. This leads to many problems which often involve the two governments and the treaty lays down principles and establishes a device for handling these before they grow into international incidents, he explained.

The treaty is not an oil alliance. It does not pretend to solve all problems. It will not regulate the domestic or foreign activities of oil companies. The International Petroleum Commission is merely a forum for discussion and cannot possibly become a control body, and there is no foundation for criticisms that it will be a cartel, form the basis for government regulation, or extend the powers of the federal Government, the undersecretary insisted. It is a straightforward attempt to find a basis and a method for solving common problems and has no hidden or ulterior purposes, he added.

Acheson Answers Questions

Answering questions from several senators, Acheson said the department endorses the interpretations advanced in a resolution of the American Petroleum Institute; that the department had considered the views of independent producers and attempted to meet them; that the treaty would not bind the United States to go to the aid of the British or British oil interests in case of difficulties abroad; and that the Dutch and other nations will be invited to join in a multilateral oil treaty some time in the future which will then be presented to the Senate for ratification as a separate document.

Asked what the treaty provides that cannot be done without it, Acheson said it provides a cooperative approach through an established forum, the International Petroleum Commission; promotes industry-government collaboration; establishes principles of foreign policy; condemns practices restrictive of international trade; and provides a method to dissolve differences before they become serious problems. He added that the treaty is an enunciation by two governments of the principles they will follow and is not binding on the nationals of either country.

Charles Rayner, department petroleum adviser, stressed that the treaty is only voluntary and consultative and contains no element of compulsion. As concrete advantages he listed: technical and economic discussion of problems by experts of both governments; consultation and collaboration between industry and government; foundation for a multilateral agreement; explicit condemnation of restrictive practices; respect for legally acquired concessions; recognition of equal commercial opportunity; safeguard for the interests of producing countries; and method for resolving difficulties at their inception.

Article II Arouses Questioning

Chairman Vandenberg remarked that while these objectives are widespread they do not seem very concrete, and asked if there were cases of molestation of concessions. Rayner replied that there have been suspicions of such but he could cite no specific instance.

Most of the questioning revolved around Article II, which is to apply to domestic activities, particularly Paragraph C which states that the domestic industry shall not be hampered by restrictions inconsistent with the treaty. Sen. Tom Connally of Texas asked what would happen if some state law on production was alleged to conflict with the treaty, and Rayner replied that nothing could be done about it but that the treaty contemplates that both nations will continue to function within the framework of existing law.

Connally pressed for the initial origin of the treaty, asking if it were not the idea of former Secretary of the Interior Ickes, but Rayner insisted it developed within the State Department.

Several senators expressed the fear that the treaty might develop into more than appears on its face, and Senator George of Georgia remarked that many international agreements have been loosely drawn and their implications are now creating problems. He said the A.P.I. reservations would not be binding unless approved by the other signatories but even so Section II might override the reservations.

Sen. Henry Cabot Lodge of Massachusetts drew from Rayner statements that the provision on equal economic opportunity would not prevent the United States from seeking superior opportunity to obtain foreign oil for strategic reasons, nor would the treaty prevent the U. S. from instituting a conservation program.

"Natural Economic Trend"

Connally asked if the purpose is to let the British supply the Eastern Hemisphere and keep U. S. oil at home, and Rayner replied that such is not the purpose of the treaty but that this is the natural economic trend.

Charles Fahy, legal adviser to the State Department, said that the objections of independents are based on legal interpretations, which he attempted to prove are unfounded. He said there is no danger that state powers will be affected as was the case under the migratory bird treaty, because that treaty expressly bound the federal Government to take specific actions whereas the oil treaty can have no domestic effect unless Congress enacts new legislation and none is called for by its terms. He also said there is no legal basis for fearing that the international petroleum commission can exercise any control or regulatory powers or make binding recommendations to the governments.

Other witnesses present to testify for the treaty included Oscar Chapman, undersecretary of the Interior; Ralph K. Davies, former deputy petroleum administrator; Col. G. H. Vogel of the Army-Navy petroleum board; A. Jacobsen of Amerada Petroleum Corp.; Eugene Holman, president of Standard Oil Co. (N. J.); George A. Hill, Jr., president of Houston Oil Co.; and Joseph E. Pogue, vice president of Chase National Bank.

Fahy was closely questioned on the legal implications of Article II and the A.P.I. reservations, and he said that under them Congress could do nothing that it now lacks power to do except that it is pledged to follow the principles of the treaty in whatever actions it does take. If a state should pass a law in violation of the treaty the federal Government would be obliged to make representations

to that state but could do no more than use persuasion. He did admit that any latent or unused powers of the federal Government respecting the oil industry could be called into play in fulfillment of the treaty obligations.

Fahy said he was almost willing to urge ratification on the basis that Article II has no meaning, but Senator Smith of New Jersey asked him why not eliminate the phrase in Section 7 which says that only Article II applies domestically. Fahy replied that this would make the treaty apply only to international trade and would eliminate the misunderstandings and controversy.

Because the committee found it could not complete hearings in 2 days it interrupted testimony by proponents to hear three Texas opponents out of order.

Glenn H. McCarthy, Houston, independent producer, insisted that the revised treaty contains all the bad features of the original draft and its real purpose is to provide federal control of the domestic oil industry and be the first step in an international cartel agreement.

Culberson's Views

Olin Culberson, member of the Texas Railroad Commission, also said both drafts have the objective of a radical change in U. S. oil operations, direct or indirect federal control, and establishment of cartels and quotas in international trade. He said the International Petroleum Commission undoubtedly would recommend a certain channeling of imports and exports and that the U. S. Government would be obligated to follow such recommendations or to give antitrust immunity to big oil companies to follow such recommendations.

Asked by Senator Lodge what our import policy should be, Culberson said we should not import so long as we can produce efficiently, but would not go along with the proposal that we exhaust all our own oil before permitting imports.

Commissioner William J. Murray of the Texas Railroad Commission presented a statement on behalf of the governor which said he was greatly disturbed that the treaty would destroy the exclusive powers of the State of Texas to regulate its greatest industry. The governor said he did not consider the A.P.I. reservations binding and in any event some future administration might interpret and use the treaty in a different way from that envisioned by its present advocates.

William R. Boyd, Jr., president of American Petroleum Institute, presented the reservations voted by the A.P.I. directors last January and said he thought this would cover objections of the American oil industry unless the committee found something the A.P.I. had overlooked.

Shortage Threat Most Critical in Middle West, Wilson Says

by C. O. Willson

ST. LOUIS.—There is a real danger of a shortage of petroleum products in this country, particularly in the Middle West, during the next 10 months, Dr. R. E. Wilson, chairman of the board of Standard Oil Co. (Ind.), told the membership of the Division of Refining of the American Petroleum Institute which held its semiannual meeting here June 2-3.

Wilson, who is an A.P.I. vice president in charge of the Refining Division, made the same prediction to the daily press in an interview in which it was pointed out that consumers can protect themselves and aid the oil industry by filling their furnace oil tanks during the summer months, thus adding to the quantity of fuel that can be accumulated over the next few months in anticipation of the record consumption of fuels to start next fall. He estimated shortages up to 10 per cent depending largely on temperature conditions through the fuel-consuming season.

Reiterating his often expressed belief that the technology and management of the petroleum industry, if given freedom and reasonable incentives will be able to take care of long-range consumer demands wherever they arise, Wilson said the present supply situation was brought about by the war limitations on construction, the shortages in equipment and materials which have held back postwar expansion and the unexpectedly large increases in demands.

Wilson explained that the fundamental shortage confronting the petroleum industry and its customers has to do with transportation. He said there is sufficient crude oil in domestic and foreign fields to meet demands and the total capacity of domestic refineries exceeds the expected requirements. The difficulties in supply arise from the fact that there are not sufficient pipe-line, water, and rail-transportation facilities to assure the needed distribution from fields and plants to consuming plants. He pointed out in this connection that a shortage of pipe was delaying important construction programs while the U. S. Maritime Commission has requests for 337 tankers for the month of June and has only 169 in service. The necessity of Congress extending the chartering of tankers beyond July 1 when the present arrangements expires and the need for repairing tankers now out of service, were stressed. *(See comments on this situation, Watching Washington pages 50-51).*

Abstracts of technical papers presented at the St. Louis meeting of the A.P.I. Division of Refining will appear in The Oil and Gas Journal, June 14. The discussion given by J. G. Housman, Standard Oil Co. (Ind.), Whiting, on "Maintenance of Tubular Heat Exchangers," also will be published in abridged form in a subsequent issue of the Journal.

Wilson explained that the pipe lines now projected for the Middle East would aid the transportation situation by reducing tanker movements. He was critical of the sale of 30,000 tons of seamless and welded pipe to Russia last year. He estimated that the tank-car shipments from West Texas now average 73,000 bbl. daily and explained that his company is now preparing to ship 12,000 bbl. daily of crude oil by tank car from West Texas and Wyoming to its Whiting, Ind., refinery.

Stock Buildup Delayed

"During 1946 over a million and half oil burners and space heaters were installed, many of them in temporary housing without adequate insulation," Wilson said in explaining the record demand for the intermediate products of the past winter. "As a result the building up of stocks for the next heating season, which normally starts about the end of March, did not yet get under way until the second week of May. This is particularly serious in view of the fact that unfilled orders for space heaters and oil burners on manufacturers books as of last December 31 totaled 2,650,000."

Wilson said that strikes at refineries has been a factor in operations this year. He estimated that these strikes had reduced crude runs to stills a total 12,000,000 bbl.

Approximately 250 members and guests of the A.P.I. Refining Division attended the 2-day meeting. Several technical papers dealing with research and development work and plant operations were presented at the four business sessions. Several

meetings of standing committees were held before and during the meeting, and progress reports were made. These included committees on petroleum products, research, disposal of refinery wastes, analytical research, and training in refining. Work is now under way on a revised booklet covering recommended practices in disposal of refinery waste. Indicative of the importance of the subject it was stated that refiners in the Chicago area alone were spending several million dollars in the solution of this disposal problem.

Albert E. Miller, chairman of the committee on evaluation of foreign technology, said that in his opinion about the only reparations this country would get from its participation in World War II would come from its use of this foreign technology. He said that the proposal now before Congress to reduce appropriations being used to analyze and distribute this foreign technology would be a serious loss to the petroleum industry.

In an analysis of the relationship of refinery capacity to petroleum product demand, Fred Van Covern, director of the A.P.I., department of statistics, said crude-oil production and refining capacity for the country as a whole is sufficient but that transportation difficulties may result in local shortages next winter.

Refinery-Construction Survey

The A.P.I. statistical head presented a summary of replies to a questionnaire on new refining construction showing that 49 companies representing 80 per cent of the nation's total capacity are planning new construction to be completed by December 31, 1949, to the extent of 407,000 bbl. daily of which 100,000 bbl. daily is marked for replacement.

For the United States as a whole, new capacity and the quarter in which it is expected to begin operating, as indicated in the survey, follow: 1947—second quarter, 12,000 bbl. daily; third quarter, 139,000 bbl. daily, including 85,000 marked for replacement. 1948—first quarter, 45,000 bbl. daily, second quarter, 12,000 bbl. daily; second half, 53,000 bbl. daily, including 15,000 bbl. daily marked for replacement. 1949—first half, 134,000 bbl. daily; second half, 12,000 bbl. daily.

"While over-all country-wide availability would appear to be sufficient, and the same holds true in the case of the individual refining districts during the period under consideration, the amount of new capacity being constructed is surprisingly low," he said. "This is doubtless due both to high construction costs as well as to a lack of materials."

Frame Defends Higher Octanes

A strong defense of the trend toward higher octane ratings in motor fuels was presented by A. P. Frame, head of the manufacturing department of Petroleum Advisers, Inc., a Cities Service affiliate of New York. Frame, who served as chairman of the refining division of the Petroleum Administration for War during part of the war period, discussed at some length the technological and economic trends in petroleum refining which will have a bearing on gasoline quality in the future.

"As a springboard for this plunge into the future I would like to synthesize a typical modern refinery of the year 1938," Frame said. Assuming a typical refinery of that year processing 75,000 bbl. daily of average Mid-Continent crude oil with modern and well-balanced equipment of that time, Frame gave the following yields:

Product—	Per cent
Gasoline (68.3 A.S.T.M. octane, clear)	53.8
Kerosene, clear	5.5
Distillates	13.0
Residual fuel oil	23.5
Gas and losses	4.2
Total	100.0

He compared these yields with a typical refinery in 1950 processing 100,000 bbl. daily with all the modern processing facilities including catalytic cracking to largely take the place of thermal cracking. He projected the following yields for the 1950 plant:

Product—	Per cent
Gasoline (72.9 A.S.T.M. octane, clear)	58.3
Kerosene	5.5
Diesel fuel	3.5
Distillate	16.0
Residual fuel oil	10.9
Gas and losses	5.8
Total	100.0

"When these 1950 yields are compared with the 1938 yields, it is interesting to note that the 1950 percentage yields of gasoline and distillate fuels, excluding kerosene, have increased by 8 and 50 per cent respectively," Frame explained, "that the kerosene yield is unchanged and that the percentage yield of fuel oil has decreased 54 per cent. If the yield comparison is made on the total volume our 1950 hypothetical refinery would produce in barrels 44 per cent more gasoline, 33 per cent more kerosene, 100 per cent more distillate fuels and 38 per cent less residual fuel. It will be of more than passing interest that the percentage yields represent an increase of about 11 cents per barrel of crude in the total value of refined products yielded than do the 1938 yields based on today's price structure."

Frame discussed the difference in quality of gasoline in the two refinery operations.

The boiling range of the 1950 gasoline will be materially higher with a substantial increase in octane number. The 1950 gasoline has a pronounced increase in the percentage of aromatic and olefinic compounds with a corresponding decrease in the percentage of paraffinic and naphthenic constituents.

In answering what he termed the sixty-four dollar question: "Is the octane race worth while?" Frame said the race would work a hardship on the smaller refiner because of the large increase in capital expenditures and increased operating costs. He said the octane race would aid the automotive industry as it has in the past by assuring improved performance of motor vehicles.

"It seems to me that the so-called octane race which historically has consisted of the petroleum industry selling greater and greater quantities of higher and higher quality gasoline at prices which have been well below the price level of other commodities, and which has contributed to the expansion of the automotive industry and consequently all industry, should be regarded as an outstanding example of the advantages of free enterprise in a democratic state," Frame concluded. "Looking at the broad picture it appears impossible to believe otherwise but that the octane race, heart breaking as it seems at times, is worth while for our industry and the country as a whole."

Atomic-Energy Development

Atomic energy will become a source of power within 10 years competing with coal and oil, Dr. Arthur H. Compton, chancellor of Washington University, St. Louis, predicted at the dinner meeting June 2. In an exceptionally well-received address, Compton, who was active in the atom-bomb development from its beginnings, said it may be a generation hence before the total uranium power production will compare in magnitude with that of coal. Compton stressed the fact that the atomic bomb made necessary international cooperation as its use meant in effect that all nations were dependent on others.

Public Relations Discussed

Ralph C. Champlin, Ethyl Corp., New York, and vice chairman of the Institute's public-relations operating committee, discussing the A.P.I. public-relations program, told the meeting that rugged individuals of the oil industry have been "shrinking violets" in public matters. Usually, he said, whenever a spokesman for the oil industry is cajoled into the spotlight of public opinion, he has talked about molecules and hydrocarbons, seismograph and geographical explorations — seldom in words that would affect public opinion of the motives and policies of the oil industry.

_____this week

INTERNATIONAL—Jersey Standard announces Iraq Petroleum partners have reached basis for new agreement eliminating restrictions against independent action laid down in old "Red Line Agreement.". . . New arrangement, accepted by all partners except Gulbenkian, provides participating companies will obtain crude on basis of need rather than in fixed proportion. . . . ¶Shell discloses agreement with Gulf Exploration to buy Kuwait crude. . . . ¶Mexican oil workers accept wage-cut and dismissal reorganization plan designed to end Pemex labor troubles. . . .

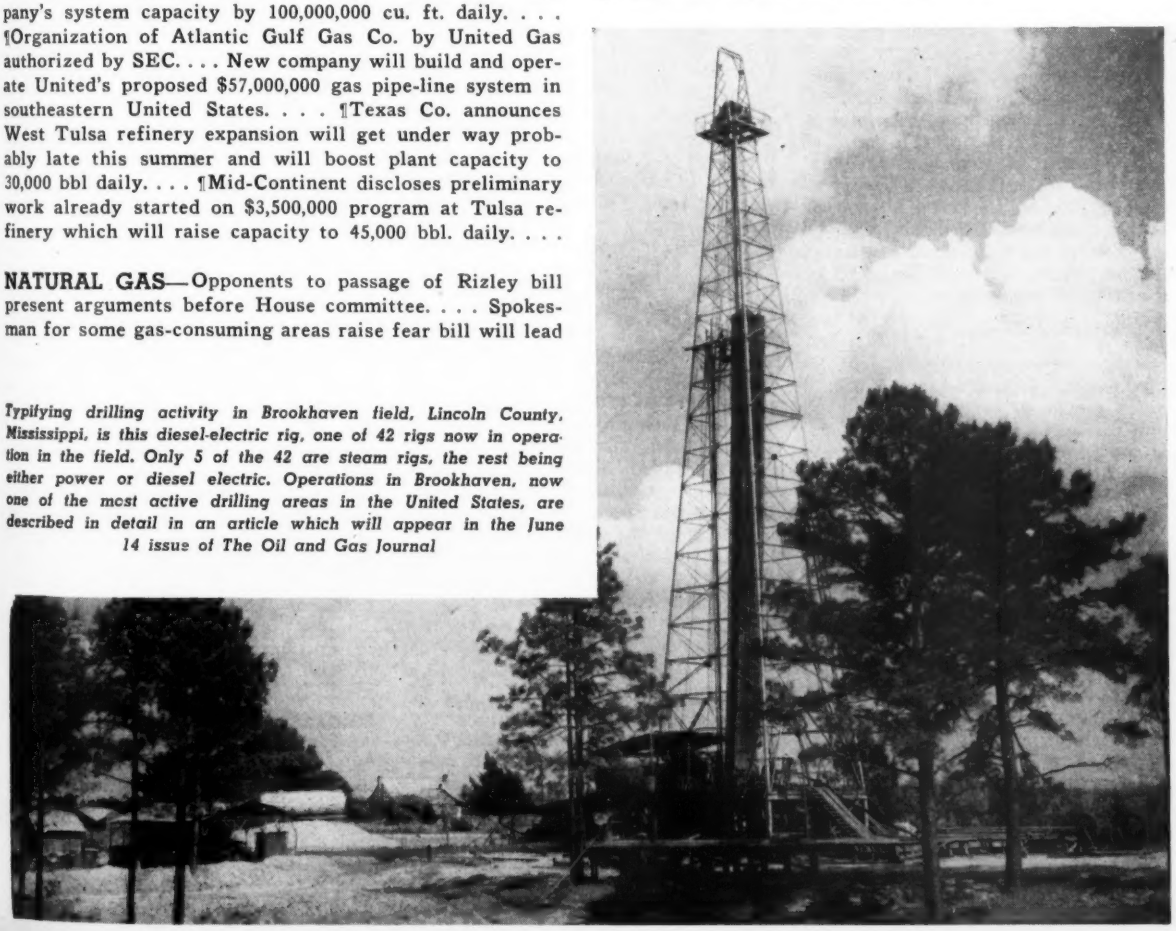
SUPPLY AND DEMAND—Industry leaders make new predictions of localized shortages of some products the last half of this year. . . . ¶Dr. R. E. Wilson, Indiana Standard board chairman, tells A.P.I. Refining Division shortage threat most serious in District 2 and that transportation is the main bottleneck. . . . ¶William R. Boyd, A.P.I. president, says companies may have to ration supplies in some areas, though there will be no serious over-all shortage. . . . ¶Bureau of Mines reports total petroleum demand in the first quarter exceeded all records at 5,919,000 bbl. daily. . . .

EXPANSIONS—FPC approves new Kansas-Denver line of Colorado Interstate Gas. . . . Project to increase company's system capacity by 100,000,000 cu. ft. daily. . . . ¶Organization of Atlantic Gulf Gas Co. by United Gas authorized by SEC. . . . New company will build and operate United's proposed $57,000,000 gas pipe-line system in southeastern United States. . . . ¶Texas Co. announces West Tulsa refinery expansion will get under way probably late this summer and will boost plant capacity to 30,000 bbl daily. . . . ¶Mid-Continent discloses preliminary work already started on $3,500,000 program at Tulsa refinery which will raise capacity to 45,000 bbl. daily. . . .

NATURAL GAS—Opponents to passage of Rizley bill present arguments before House committee. . . . Spokesman for some gas-consuming areas raise fear bill will lead to higher prices. . . . ¶FPC completes investigation of Chicago Corp., ruling the company is not subject to the Natural Gas Act. . . . ¶FPC proposes new administrative rule defining production and gathering operations exempt from its jurisdiction. . . . Comments on proposed rule asked by July 7. . . .

SALES—Cooperative Association buys controlling interest in Black-Marshall Oil Co., Great Bend, Kans., which has some 210 wells with combined allowable of about 200,000 bbl. monthly. . . . ¶R. L. York, Midland, Tex., producer, sells producing properties to York & Harper, Inc., Midland, and Sloan & Zook, Bradford, Pa., for a reported $1,000,000. . . . Deal involves 97 West Texas producing wells. . . . ¶Shamrock Oil & Gas announces purchase of Magnolia's Sunray, Tex., gasoline plant. . . .

EXPLORATION—Lacy well, Cameron County, Texas, opens new gas-condensate pool from 7,520-32 ft. . . . ¶Humble test, southwestern Ector County, Texas, has oil show in Devonian at 8,230-83 ft. . . . ¶Brunson field in Lea County, New Mexico, gets south extension. . . . ¶Three wells in Big Horn Basin, Wyoming, now making 1,500 bbl. per day. . . . ¶New Leduc field in Alberta has potential production of 1,000 bbl. from three wells. . . .



Typifying drilling activity in Brookhaven field, Lincoln County, Mississippi, is this diesel-electric rig, one of 42 rigs now in operation in the field. Only 5 of the 42 are steam rigs, the rest being either power or diesel electric. Operations in Brookhaven, now one of the most active drilling areas in the United States, are described in detail in an article which will appear in the June 14 issue of The Oil and Gas Journal

Opposition Heard on Rizley Bill; Eminent Domain Supported

by Henry D. Ralph

WASHINGTON. — Hearings on all bills to amend the Natural-Gas Act were completed by the House committee on interstate commerce last week, and the committee indicated it will soon take up the subject in executive session with the view of reporting a measure for House action.

The majority of the witnesses at last week's hearings were opposed to the Rizley and other bills supported by the oil and gas industry, most prominent being Nelson Lee Smith, chairman of the Federal Power Commission, who urged the committee to deliberate all proposals carefully and particularly to await the FPC report on its natural gas investigation.

There also appeared a number of authorized spokesmen for the officials of gas-consuming cities who raised the fear that relaxation of federal control of interstate pipe lines will mean higher prices for gas to consumers or diversion of gas to new markets to the disadvantage of present customers.

The National Association of Railroad and Utilities Commissioners, while neither favoring nor opposing the Rizley bill, submitted a series of amendments designed to make sure that whatever regulation of the natural-gas industry is given up by the federal Government will be left open for exercise by state commissions so that no phase of the industry will be left entirely unregulated.

Eminent Domain Proposal

Several witnesses testified on the Schwabe bill, H.R. 2956, which would confer power of eminent domain to condemn right-of-way on any natural-gas company having a certificate from the Federal Power Commission authorizing construction of a line.

David T. Searls of Houston, attorney for Texas Eastern Transmission Co., pointed out that the bill uses the same language as the eminent-domain section of the Federal Power Act pertaining to electrical utilities and is necessary to give gas companies the tools with which to carry ou the intent of Congress when operating under a construction certificate. State laws for eminent domain vary and are deficient for purposes of an interstate gas line, he explained, adding that if a state commission is allowed to trade eminent-domain power for gas service within the state it could require all the gas to be used within the state and block interstate commerce. All questions of necessity of the line, its economic justification, and effects on other industries should be considered by FPC before granting a certificate and have no relation to acquisition of right-of-way after the certificate is issued, he insisted.

A similar argument was made by J. J. Hedrick, general counsel of Natural Gas Pipe Line Co. of America, who added that after a railroad has had its day in court before FPC in opposing a new line it should not be permitted to block construction by refusing easments under its tracks. He cited a current case in Illinois where a railroad granted his company permission to cross its right-of-way only for the purpose of delivering gas to certain classes of customers at specified rates and not valid for moving gas under certain other rate schedules already approved by FPC. He said this was an attempt to usurp the rate functions of FPC and puts the gas company in the position of having to violate the FPC order if it adhers to the restrictions imposed by the railroad. Hedrick also asked an amendment to give eminent domain in cases where FPC rules permit new construction without a specific certificate for the work.

Even more impressive was the testimony of F. L. Daily, attorney for the Chicago District Pipe Line Co. He said that to meet the current gas shortage in Chicago his company has been ordered by FPC to lay new lines but has been unable to do so because it cannot acquire right-of-way. In some places the line will have to follow circuitous routes, where the operation is difficult and expensive, but about a dozen land owners, controlling a total of some 5 miles needed to complete the right-of-way, refuse to sell outright or give easements at any price or only at exhorbitant prices, he explained, adding that all these extra costs must be charged aginst consumers in the form of higher gas rates.

Constitutionality Questioned

One witness opposed the Schwabe bill, John M. Crimmins, of the law department of Koppers Co., Inc., Pittsburgh. Admitting that his company, which manufactures gas in eastern states, opposes use of the Big Inch pipe lines for gas through Pennsylvania, Crimmins said his objections were based on the public desirability of the bill, and raised these objections: it might be unconstitutional because it is condemnation for a private use since a gas pipe line is not strictly a public utility; it would place an impossible administrative burden on FPC if every landowner on the proposed right-of-way were given a hearing; it is an unjustified invasion of the governmental powers of the states if applied against state-owned lands; it is not comparable with the Federal Power Act which gives right of eminent domain only for dam sites, to which there is no alternative, but not for transmission lines; and it would place it beyond the power of the states to require a gas line to serve the inhabitants of that state.

Chairman Smith of FPC said the commission has no objection to the Schwabe bill, but he did not endorse it.

Cities Fear Rate Increase

Leading the spokesmen for city governments opposing the Rizley and companion bills were Jerome M. Joffee, chairman of the committee on electric and gas rates of the National Institute of Municipal Officers, and special utilities counsel for the city of Kansas City, Mo. He said that for years prior to enactment of the Natural-Gas Act many cities fought in vain to reduce local gas rates but were unable to control city-gate rates because this involved interstate commerce, and he presented to the committee many letters from mayors and resolutions of city councils raising the fear that enactment of the Rizley bill would weaken federal regulation to such an extent that wholesale city-gate rates would increase.

Specific objections raised by Joffee were that removal of restrictions on end use of gas will mean construction of new pipe lines to supply boiler fuel to remote parts of the country, thereby depleting the supply for domestic consumers in the Southwest; removal of control over processing natural gas will increase rates to consumers; removal of control over production and gathering rates will permit pipe-line companies to boost the price of their own production to an artificially set field price; requirement that FPC act on new applications within 60 days will deprive cities of due process because they cannot intervene in so short a time; and permitting a pipe-line company to enlarge its facilities in present markets without a certificate will permit it to divert gas from old customers to more profitable new markets.

A similar plea was made by David M. Proctor, city counselor of Kansas City, Mo., who said that federal regulation should not be relaxed in such

a way as to encourage the sale of gas in remote areas and for industrial uses without assurance of adequate protection for domestic consumers in areas near gas fields and in cities which have come to depend on natural gas for residential purposes.

Robert M. Morgan, assistant director of law of the city of Cleveland, Ohio, opposed the bill chiefly because it would remove control over the input price of gas which is the chief factor in the city-gate sales price. He declared that transmission companies are usually the sole outlet for gas in any field and, unless regulated, will be able to set the so-called field price since they would have no incentive to obtain gas cheaply but the selfish incentive of making the price high and passing it on to consumers. Suggesting that Congress could well declare gas pipe lines common carriers and require them to divest themselves of ownership of the gas transported, Morgan said he is not advocating such a law but the need for it can be avoided by retaining regulation of the price of gas entering trunk lines. He declared that all complaints of gas companies against the present law can be cured by intelligent administration and that the courts will protect gas companies against unreasonable actions by FPC but the commission should not be blindfolded in consideration of whether the cost of gas is set in a bona fide market.

Consumer Protection Cited

Charles S. Thomas, corporation counsel of the city of Rockford, Ill., opposed the Rizley bill on the ground it would deprive FPC of regulatory powers needed to protect consumers, would permit unlimited expansion of gas distribution to new areas thus making worse the shortage in areas now dependent on gas, and would permit gas companies to compute their operating expenses in a way most favorable to them and with little control by any governmental agency.

James W. Haley, attorney for the National Coal Association, supported the Dolliver bill (H.R. 2569) which would direct FPC to consider conservation of gas and effects of new pipe lines on other fuels. He pointed to the large number of new pipe line applications pending before the commission as proof that the gas industry is not hampered in expansion and that unless the commission places limits on new construction, gas reserves will be depleted rapidly. Opposing the Rizley bill, Haley said gas companies want all the benefits of public utilities but none of the responsibilities and obligations, adding that the coal industry probably would support a move to repeal the present Natural Gas Act entirely.

John Schreiber, secretary of the Eastern States Retail Solid Fuel Conference, argued that natural-gas lines should be subject to the same regulation as any other public utility and that their certificates to operate should be restricted to certain services and forms of competition. In the name of free enterprise, he declared, the gas industry wants the powers of FPC reduced to little more than routine granting of certificates which would then carry the power of eminent domain, and enactment of the Rizley bill would eliminate any effective regulation of the gas business.

State Regulation Provided

The amendments to the Rizley bill proposed by the National Association of Railroad and Utilities Commissioners were presented by its advisory counsel, John E. Benton. He explained that the association takes no position on the bill but if it is enacted it should be revised to make sure that state commissions have authority to regulate those phases of the gas business which the federal Government could regulate but is not doing. Citing many court decisions in support of his contention, Benton said that failure of Congress to exercise all its constitutional regulatory powers could be construed to prevent the states from acting unless the law makes it clear that the states retain such power.

For example, Benton said, denial of FPC jurisdiction over direct sales to industrial customers is being used by some companies as an argument that state utility commissions cannot regulate industrial sales within their borders. He contended that this same type of argument would be used to defeat state regulation of any other aspect of the gas business removed from FPC jurisdiction by the Rizley bill and without amendments large sections of the industry would be exempt from any regulation. The purpose of the original act, he declared, was to give FPC control only of interstate activities not subject to state control, not to exempt the industry from any control.

Benton also asked that the bill incorporate definitions of "transportation" and "trunk transmission facilities" so as to make it clear that FPC retains control over all purely interstate activities, including intercompany sales in interstate commerce. Without such, he said, gas might be sold from company to company in such a way that FPC would have control over the last sale prior to retail distribution.

Another amendment endorsed by Benton's group would give FPC power to require a natural-gas company to give reasonably adequate service to communities it undertakes to supply, and would prevent direct industrial sales not under state regulation if such sales would impair service to customers under regulation.

In opposing any legislation at this time, Chairman Smith of FPC made substantially the same argument as before the Senate interstate commerce commission several weeks ago, namely that Congress should have the benefit of the commission's final report in its natural-gas investigation, which will not be ready until fall.

The commission, he insisted, is not stubbornly opposing all amendments, and some of the proposals may have much merit, but the reason for the FPC investigation was to advise Congress on needed changes in the law and piecemeal legislation should not be attempted until all the evidence is in. There is no need for hasty action, he said, because nothing Congress can do will prevent another gas shortage next winter since the demand has far outstripped the ability of the companies to lay new lines and install additional facilities which have been authorized.

No Field-Price Regulation

The FPC chairman denied all charges that the commission is attempting to regulate the nation's fuel economy but explained that it is using its limited authority to cooperate with state officials and gas companies in emergency allocation of gas where there are shortages.

Specific provisions of the various bills were not discussed in detail by Smith, but he did spend considerable time on production and gathering. He said the commission draws a clear distinction between production by an independent who sells to a pipe-line company in an arm's-length transaction, and the case of a pipe-line company which produces its own gas or purchases from an affiliate. He cited several FPC decisions, most of them handed down during the past week, to show that there is no attempt to regulate field prices or arm's-length transactions, but he insisted that FPC must have control over the price which a pipe-line company fixes for gas produced by itself for sale in interstate commerce.

Several members of Congress made brief statements in support of the Rizley bill. Rep. Eugene Worley of Texas said the act should make clear, as was its original intention, that FPC is to regulate only interstate business not subject to state control and not any phase of the industry subject to state commissions. Rep. Orville Zimmerman of Missouri asked that the bill make clear that FPC has no jurisdiction over a stub line built by a local gas-distributing company to tap a trunk line running within the state. Rep. John E. Lyle of Texas said that the large investment required to conserve flare gas is being postponed because of uncertainty as to whether state or federal commissions have jurisdiction and he argued that such installations should not require control from Washington.

International

WORLD-WIDE OIL DEVELOPMENTS

Red Line Agreement Replaced By Major I. P. C. Partners

NEW YORK.—The basis for a new agreement by major partners of Iraq Petroleum Co., Ltd., acceptable to the French participants, has been reached after a series of conferences in London, Standard Oil Co. (N. J.) announced June 2.

The new agreement, if concluded, would replace the original group agreement signed by the partners in 1928 and would thus eliminate the circumstances under which the French partners recently instituted legal action to prevent Jersey Standard and Socony-Vacuum Oil Co., Inc., from acquiring an interest in Arabian American Oil Co.

If an agreement is signed on the new basis, production of Iraq Petroleum will be expanded substantially, and the partners would obtain crude from the company in accordance with their needs rather than in fixed proportion to the total production as has been the case previously. The further increase in production would not actually take place until about 1952, the earliest time by which the necessary additional pipe-line capacity could be completed. The new agreement would also eliminate the previous restrictions against independent action by the partners in developing oil resources within a large area of the Middle East.

Gulbenkian Has Not Accepted

According to Jersey Standard officials, who recently returned from London, the new basis has not yet been accepted by C. S. Gulbenkian, who owns 5 per cent of the Iraq Petroleum Co. through his ownership of Participations & Investments, Ltd., and the latter's acceptance is necessary before the agreement can be concluded.

Meanwhile there is no change in the status of the proposed acquisition of stock by Jersey Standard in the Arabian American Oil Co. Announcement was made on March 12 that acquisition of this stock had been postponed pending the completion of a new agreement among the Iraq Petroleum partners or settlement of the legal questions involved.

Jersey Standard's official announcement did not indicate when acceptance of the new agreement by Gulbenkian is likely, but other sources in New York said it is believed this will be forthcoming soon. Gulbenkian is said to have long favored expanded interest of strong United States companies in the Middle East and to have regarded with favor the plans of Jersey Standard and Socony-Vacuum to become Arabian American partners.

Two Firms Negotiating

Jersey Standard and Socony-Vacuum in December announced they were negotiating to buy interests in the Arabian American Oil Co. which is owned jointly by Standard Oil Co. of California and The Texas Co. and which operates the Saudi Arabian concession now producing some 200,000 bbl. daily.

Subsequently reports disclosed Jersey Standard would acquire a 30 per cent interest, and Socony-Vacuum, 10 per cent. Information filed with the Securities and Exchange Commission showed Jersey Standard would pay $76,500,000, and Socony-Vacuum $25,500,000.

These two companies through Near East Development Corp. hold a 23.75 per cent interest in Iraq Petroleum Co. with production of 97,000 bbl. daily in Iraq and large concessions elsewhere through the Middle East. Other partners in Iraq Petroleum are D'Arcy Exploration Co., Ltd., a subsidiary of Anglo-Iranian Oil Co., Ltd., 56 per cent owned by the British Government; Anglo-Saxon Petroleum Co., British Unit of the Royal Dutch-Shell; Cie. Francaise des Petroles, S.A., 35 per cent owned by the French Government, and Gulbenkian and associates.

Iraq Petroleum, which originally was formed in 1911 as the Turkish Petroleum Co., was reorganized after World War 1 when the American industry was given an interest following State Department insistence. The participating companies continued an agreement providing that within the area of the old Turkish Empire they would carry on no oil operation except for joint account. The area of joint operations included Arabia and was circumscribed by a red line. Thus the agreement became known as the "Red Line Agreement." It was on the basis of this agreement that Cie. Francaise instituted legal action in Great Britain in what was apparently an effort to block the purchase of the Arabian American interest by Jersey and Socony. The two American companies contended Cie. Francaise's status as an enemy alien during the war had voided the agreement. The conferences in London, which resulted in the basis for the agreement announced this week, followed.

A.G.I.P. Schedules Rotary Test in Southern Italy

MILAN, Italy. — Azienda Generale Italiana Petroli has sent rotary-drilling equipment to the Gargano Peninsula area in southern Italy, near Lake Varano and Lake Lesina, to develop newly discovered oil and gas deposits.

The new discovery, according to some geologists, is believed to indicate a western extension of the Albanian oil fields. The new equipment sent into the area is scheduled to drill tests to about 10,000 ft. Two producers are reported completed in the Lodi district (Milan).

In another recent oil development in Italy, Anglo Iranian Oil Co., Ltd., is reported to have formed a subsidiary to carry out exploratory work in the Italian Peninsula. The subsidiary is reported to have suggested to the government an arrangement whereby it would utilize the Sardinian coal resources to produce oil by hydrogenation.

An application for drilling in the Ferrara district (Po Valley) is re-

ported to have been filed with the Italian minister for industry by an Italian - British concern formed recently to explore the area.

In the refining industry, A.G.I.P. has been negotiating with the Italian Government for a loan with which to construct a refinery in Sicily capable of handling 3,500,000 bbl. yearly.

Swiss and Italian interests also are reported to have formed a company which will build a refinery in the Porto Marghera district (Venice) which will refine 3,500,000 bbl. of crude annually. The plant is to be equipped with both skimming and cracking facilities. Another refinery is scheduled to be built at Genoa by Aziende Petrolifere Riunite Italiane (A.P.R.I.) with a capacity of 7,000,000 bbl. yearly.

Junta Petroleum Tests Deeper Sands in Wildcat

JUNTA PETROLEUM CO., jointly owned by The Texas Co. and Socony-Vacuum Oil Co., Inc., is now testing deeper sands in its wildcat test brought in as a natural-gas producer about 2 weeks ago in Colombia.

This well, located about 180 miles south of Barranquilla on the west side of the Magdalena River, showed an average daily production of 18,000,000 cu. ft. of natural gas. Another test well in this same area is being planned for the near future.

Reports from Bogota indicate Junta Petroleum has signed a concession contract covering the Sahagun Block, Concession Bid 148, located northwest of the Tablon Grant in Bolivar Department and southwest and adjacent to the San Andres Township fee property. It is near San Andres where Companias Unidas de Petroleo (owned by Cities Service, Richfield, and Sinclair) plans to spud in a wildcat soon.

The Junta Petroleum grant, originally solicited as 49,922 hectares (about 124,805 acres), covers 34,802 hectares (about 87,005 acres). The San Andres property covered the original area in part. It was excluded in view of the private oil title the ministry recognized as belonging to the township and under lease to Companias Unidas.

A. I. O. C. to Raise Pay

Workers for Anglo-Iranian Oil Co., Ltd., in Iran, are scheduled to receive an additional £600,000 (about $2,400,000) a year under a new wage scale approved by the Iranian Labor Council, according to a Reuters dispatch from Teheran. Under the new wage regulations, Anglo - Iranian consequently will revise its entire pay regulations, according to a high-ranking company official.

Creole's Production Down, Refinery Runs Up

AVERAGE daily crude-oil production of Creole Petroleum Corp. in Venezuela dropped again in April for the second consecutive month after setting an all-time high of 599,192 bbl. daily in February. However, Creole's refinery runs in April again showed an increase over the previous month.

The company's April production averaged 574,522 bbl. daily, of which 423,173 bbl. came from the Lake Maracaibo area and Cumarebo and the remaining 151,349 bbl. from Eastern Venevuela. This compares with the March output of 594,544 bbl. daily.

Refinery runs in April were up to 61,981 bbl. daily compared with 45,889 bbl. daily in March. Caripito refined 53,942 bbl. daily of the April total, with La Salina providing for 8,039 bbl. daily.

Sixteen Wells Completed

Sixteen oil wells were completed in Creole's development program, and five wildcats were brought in, three as oil producers and two gas wells. Average depth of the gas wells was 5,067 ft., but no tests were made. The fields where the development wells were completed, their average initial production, and depth follow: Bolivar Coasta (B.C.F.), nine, 637 bbl., 4,028 ft.; Quiriquire, four, 459 bbl., 4,063 ft.; Jusepin, two, 310 bbl., 4,714 ft.; and Mulata, one, 492 bbl., 5,329 ft.

Creole's wildcat completions showed two oil wells with an average initial production of 374 bbl. daily and an average depth of 4,583 ft. in the Jusepin area. The other oil producer brought in on the company's wildcat program was in Mulata field and showed an average daily production of 192 bbl. at 5,920 ft.

In West Lake field, Creole is drilling Shell's well VL-1.

Argentina's 1946 Crude Output Down, Imports Up

ARGENTINA'S crude-oil production dropped to approximately 21,000,000 bbl. (57,500 bbl. daily) in 1946, compared with the 1945 output of approximately 23,300,000 bbl. (63,800 bbl. daily), according to the U. S. Department of Commerce.

Last year's production by fields in barrels was: Comodoro Rivadavia, 14,592,000; Plaza Huincul, 2,266,000; Mendoza, 3,049,000; and Salta, 1,017,000.

Crude-oil and petroleum-product imports increased from 3,658,000 bbl. (10,000 bbl. daily) in 1945 to 22,547,000 (61,500 bbl. daily) in 1946. Imports consisted chiefly of crude oil, which rose from 1,045,000 (2,600 bbl. daily) in 1945 to 7,232,000 bbl. (19,800 bbl. daily) in 1946.

Residual-oil imports rose from 2,146,000 bbl. in 1945 to 14,452,000 bbl. last year. Principal sources of imports during 1946 were Netherlands East Indies, 11,133,000 bbl.; Venezuela, 8,638,000 bbl.; and the United States, 1,019,000 bbl. The balance came from other South American countries, with the exception of 366,000 bbl. of crude from Saudi Arabia.

Last Year's Contract

Under a contract signed last year between Arabian American Oil Co. and Yacimientos Petroliferos Fiscales (Y.P.F.), 2,800,000 bbl. of Saudi Arabian crude will be refined in Argentina. When Y.P.F. received its first cargo, reports indicated that there was some dissatisfaction over the sulfur content. By a combination of stabilization at Ras Tanura and certain changes made in Y.P.F.'s cracking equipment, this problem apparently was solved. Saudi Arabian crude contains from 1.3 to 1.6 per cent sulfur.

Crude-oil runs to stills in Argentina, last year, totaled 27,673,000 bbl. (75,800 bbl. daily), of which 20,808,000 bbl. (57,000 bbl. daily) came from indigenous sources and the balance foreign. Total output of refined products, in barrels, was: aviation gasoline, 101,000; motor fuel, 8,366,000; kerosene, 3,345,000; distillates, 2,511,000; residual fuel oil, 9,673,000; and other products, 3,055,000.

There are 15 commercial refineries in Argentina, six of which were built by Y.P.F. These plants have an aggregate topping capacity of about 94,000 bbl. daily, with cracking capacity of about 50,000 bbl. daily. However, some of these refineries are not operating at or near capacity due to lack of crude.

International

WORLD-WIDE OIL DEVELOPMENTS

Swedish Plan to Nationalize Imports, Sales Postponed

Because of a reported lack of U. S. dollars, Sweden's plan to nationalize the imports and sales of gasoline and other petroleum products *(The Oil and Gas Journal, March 22, page 141)* apparently will be postponed by the current Swedish session of Parliament.

Originally, it had been planned to make the nationalization move effective July 1, 1948. The refining industry was to remain, for a time, in private hands, but the output presumably would be handled by the government oil monopoly.

English Petrochemical Plant Taking Shape Near Manchester

THE Catarole process selected by Petrochemicals, Ltd., for its new plant at Partington, near Manchester, England, is, in the opinion of its inventors, particularly suitable for conditions such as exist in Great Britain and countries of the European Continent. The process, in fact, has the following characteristic advantages:

1. The charging stock is transformed into valuable chemicals and gases with no waste other than a small percentage of unavoidable loss.

2. The process yields a wide variety of products in balanced quantities.

3. The raw material used is a petroleum cut which, under present conditions, cannot be otherwise utilized to any extent without undergoing a costly treatment such as reforming and cracking. This charging stock is cheap and readily available and its transformation into chemicals does not affect to any important degree the production of the usual bulk refinery products.

Other Advantages

Other considerations which must be borne in mind are:

Catarole "tail gas" (mainly methane and hydrogen) is very suitable for raising the calorific value of blue water gas to town-gas standard. At present gas obtained by destructive cracking of gas oil is used mainly for this purpose, when natural gas is not available.

In countries where coal resources

International
WORLD-WIDE OIL DEVELOPMENTS

This article was prepared by officials of Petrochemicals, Inc., which now has under construction near Manchester, England, a plant to produce a variety of chemicals from petroleum raw material.

are insufficient to produce all the aromatic hydrocarbons and intermediates required, the process permits to use petroleum as a raw material to yield these substances.

It is in the obvious interest of countries importing petroleum to transform as much as possible of it into the most valuable products. The process produces from a low-value petroleum fraction highly priced chemicals and plays its part in lightening the burden of petroleum imports on the trade balance.

For these reasons the Catarole process represents a sound and necessary development of chemical industry in Great Britain and in Europe in general. It is probably more suited for these countries than most of the methods developed in the United States for the production of chemicals from petroleum.

A Description of Process

As the name indicates, Catarole is a process for the catalytic production of aromatics and olefinic gases from crude petroleum fractions. A petroleum fraction obtained by the straight distillation of crude oil and having a boiling range somewhere between 225° and 500° F. is catalytically cracked in the gas phase. As a result of this treatment the charging stock is transformed into two fractions of about equal weights:

1. A liquid product consisting almost exclusively of aromatic hydrocarbons from benzene up to heavy polycyclic aromatics.

2. A mixture of gases containing over 50 per cent of olefinic gases.

Cracking can be continued for rather long periods before pressure in the system increases, as a result of deposits of pitch and carbon on the catalyst. When this occurs, the flow of charging stock in the reactor is switched off and, without substantial change in the temperature of the furnace, a mixture of air and flue gases or steam is passed through the tubes and reactors. After 8 to 10 hours the carbonaceous deposits are burned off and feeding stock again charged to the reactors.

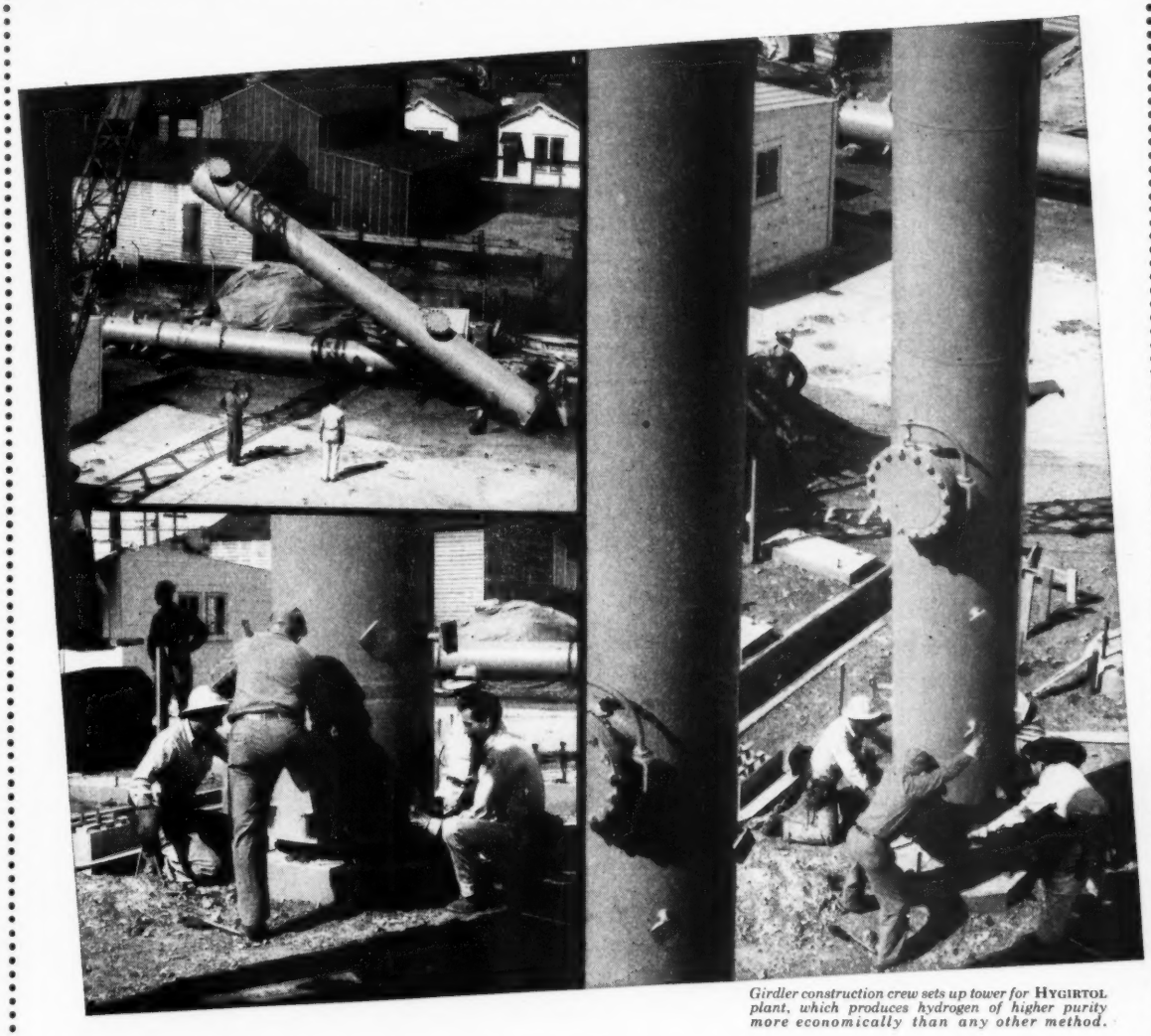
The cracked product is separated into a gaseous and a liquid fraction. The liquid portion is spit into various components, such as benzene, toluene, xylenes, styrene, alkylbenzenes, indene resins, naphthalene, acenaphthene, fluorene, anthracene, phenanthrene, pyrene, and chrysene. This is carried out by technical devices which are a combination of modern refinery technique and the usual purification methods familiar to the coal tar and chemical industry.

High-Purity Aromatics

As a result of these operations various aromatic hydrocarbons are obtained in a state of high purity. Purification is made easier and smoother by the fact that the product is almost entirely composed of hydrocarbons and that the difficulties usually encountered in the coal tar industry to eliminate impurities containing sulfur oxygen and nitrogen are thus avoided.

To separate and obtain in great purity the olefinic gases (ethylene, propylene, butylenes, and butadiene), a method was devised by which, through compression and refrigeration (cascade method) all the gases (apart from methane and hydrogen) are first liquefied (for which temperatures as low as —200° to —250° F. have to be applied) and then frac-

Construction work and the site of Petrochemicals, Inc., new Partington plant



Girdler construction crew sets up tower for HYGIRTOL *plant, which produces hydrogen of higher purity more economically than any other method.*

Girdler builds the gas processing plants Girdler designs

BECAUSE Girdler builds the gas processing plants Girdler designs, you can be sure of several important things:

A complete service, from one responsible source, that includes everything from start to finish of the job. Plant design that is thoroughly practical for construction. Construction in strict accordance with plant design. Plant tests and initial operation upon completion of construction—Girdler follows through until the plant is in full operation and you know all about how to use it.

And you benefit by Girdler's experience. Girdler-designed, Girdler-engineered, and Girdler-built gas processing plants serve most of the big names in industry.

This includes processes for gas manufacture, purification, separation, dehydration—processes involving hydrogen sulphide, carbon monoxide, carbon dioxide, inert and controlled atmospheres, natural gas, refinery gases, liquid hydrocarbons, hydrogen, nitrogen.

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Reagent

Made to Baker & Adamson's own strict Reagent specifications, this white crystalline product assays 99% min. $Hg(NO_3)_2 \cdot H_2O$. Low in iron and chloride, it offers a purity suitable for many exacting uses such as the preparation of mercuric nitrate ointments for treating skin disorders. Other applications for this material include: carroting of furs for felting into hats; manufacture of mercury fulminate used in percussion caps and detonators; ingredient of baths for producing blue-black or gray-black colors on iron and steel; manufacture of organic mercurials used for closed-system papermaking plants, for protecting soil, seeds, and wood against certain fungi and insects, and for prevention of mold formation in paints and varnishes; preparation of mercuric acetate, etc.

Rely on General Chemical's

B&A BARIUM FLUORIDE

Reagent & Technical

A superior product, low in impurities, this B&A Quality chemical assays 99% min. BaF_2 in the Reagent grade and 98% min. in the Technical. Thus, Industry has two forms of exceptionally high purity to consider for the many applications of this product. Some of these include: flux in preparation of high-copper alloys; flux or opacifier in manufacture of enamels, glass and ceramics; manufacture of heat-treating salts; as an insecticide; as an agent for insulating electrodes used in electronic cathode ray tubes; in the manufacture of arc lamp electrodes, etc.

Baker & Adamson Division

B&A ACETYL CHLORIDE

Reagent & Technical

Both grades of this B&A purity product have the same high assay of 95% min. CH_3COCl. Many users requiring quality acetyl chloride in quantity find the Technical grade meets their needs. Among the applications for this B&A Fine Chemical are: an intermediate in the manufacture of organic pharmaceuticals, i.e. heroin (diacetylmorphine); acetylating agent in the synthesis of organic chemicals such as acetophenone, acetoresorcinol, and acetamide; manufacture of acetyl peroxide.

★

This is the fourth in a series of advertisements reviewing the B&A Fine Chemicals *commercially available* to American Industry today from the Baker & Adamson Division of General Chemical Company. Scores of such purity products await your investigation. To learn more about these or other B&A Fine Chemicals that meet your requirements, write or phone nearest B&A Sales and Technical Service Office.

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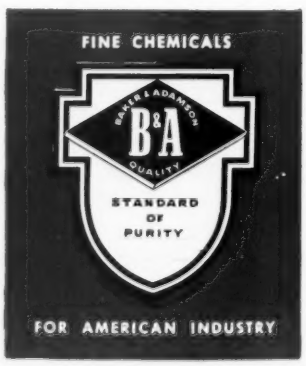
SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

*Complete stocks carried here.



tionated by distillation. This method is simple and efficient, but requires complicated equipment in order to reduce operating costs.

Flexibility of Yields

In accordance with the chemical composition and boiling range of the charging stock and by varying the conditions of operation, the proportion of liquid, solid, and gaseous end products can be altered within wide limits. This flexibility is shown in the following table:

1. Gases varying from 45 to 63 per cent by weight:

	Yields From (wt. per cent)	To
Hydrogen	0.5	1.0
Methane	13.0	24.0
Ethylene	7.0	13.0
Ethane	6.0	10.0
Propylene	9.0	11.0
Propane	1.5	2.0
Butadiene and butenes	4.0	5.0
Butanes	0.5	1.0

2. Liquids varying from 36 to 54 per cent by weight:

Below benzene	0.5	1.0
Benzene	6.0	11.0
Toluene	6.0	11.0
Xylenes	5.0	8.0
Alkylbenzenes and indene resins	3.0	9.0
Naphthalene	1.2	2.3
Alkyl naphthalenes	3.0	4.0
Other polycyclic aromatic fractions and pitch	10.0	15.0
of which:		
Anthracene	0.1—0.2 per cent	
Phenanthrene	0.3—0.5 per cent	
Chrysene	0.2—0.3 per cent	
Pyrene	0.1—0.2 per cent	

3. Losses ..... 1 to 3 per cent by weight

The Catarole process has been initiated by Dr. Charles Weizmann and Dr. E. Bergmann, together with a a group connected with Manchester Oil Refinery, Ltd., and led by Dr. F. Kind, H. E. Charlton, and Dr. H. Steiner. Investigations and experiments were carried out on a semi-commercial scale by means of a pilot plant.

Partington Construction

Sanctjon has been granted by United Kingdom planning authorities for the industrial development of a large proportion of about 800 acres at Partington. Approximately 50 acres of the land lie adjacent to the Manchester Ship Canal. The site acquired is substantially larger than that needed solely for the Catarole plant, the intention being to provide space for the construction of plants by users of the basic raw materials which Petrochemicals, Ltd., will be producing.

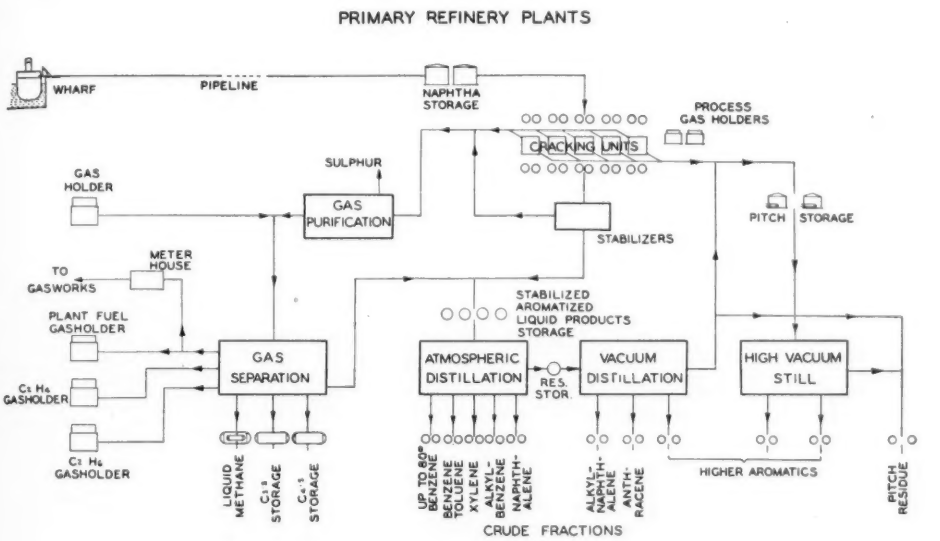
It has been arranged that Petrochemicals, Ltd., also will provide prospective users of Catarole products with cooling water from a central system, electric current, steam at various pressures and compressed air from a central plant. It is also intended that office and laboratory space will be made available in a central group of buildings.

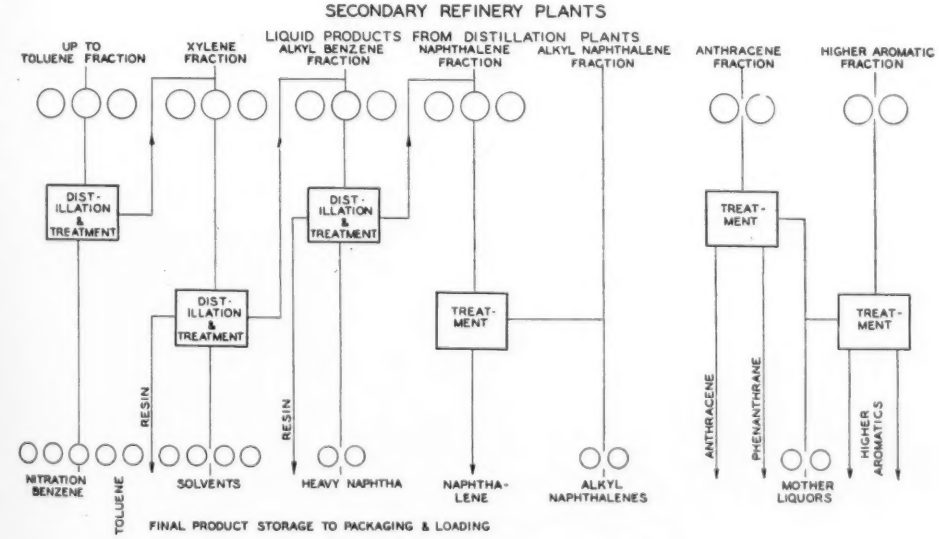
In April, construction of many of the buildings was well advanced; excavation for the main tank foundations is nearing completion, and tank erection has begun. Sheet piling is in progress in Marsey River to provide for the cooling-water offtake and the laying of the 24-in. cast-iron inlet and 36-in. concrete return mains has made substantial progress.

Installation Outline

The various plants comprising the installation can be grouped into primary units and secondary treatment units. The primary units transform the raw material into separated gases and crude liquid and solid fractions. The

(Contd. on page 133)





These diagrams show the processes in Petrochemicals, Ltd.'s, new plant

FPC Issues Proposed Rules Defining Gas Act Exemptions

WASHINGTON. — A proposed rule defining the operations of production and gathering which are exempt from the Natural Gas Act was issued by Federal Power Commission June 2, and interested parties were asked to comment by July 7, after which FPC intends to promulgate it as a part of its administrative rules.

The statement says that the rule should remove the uncertainty among state officials and the industries concerned regarding the meaning of Section 1 (B) of the act and should clarify the status of a majority of persons engaged in production and gathering. It added, however, that in some complex situations the distinction between gathering and transportation cannot be prescribed by mere definitions, and borderline cases must be decided on the basis of the particular facts so the rule will not resolve every jurisdictional question.

Text of Proposed Rule

The text of the proposed rule is as follows:

"Production, gathering, and transportation defined and distinguished. (A) The commission is of the opinion that the exemption contained in Section 1 (B) of the Natural Gas Act, to the effect that the provisions of the act shall not apply to the 'production or gathering' of natural gas, was intended by Congress to exempt from the jurisdiction of the commission all activities in producing and gathering natural gas—including sales made at arm's length—by those who only produce, gather, or process natural gas exclusive of its transportation and subsequent sale in interstate commerce.

"(B) To clarify further this determination and conclusion, the commission adopts the following definitions:

"1. 'Production' means the extraction of natural gas from wells or reservoirs and the recovery of residue gas from natural gas or casing-head (oil-well) gas by the removal of natural gasoline, propane, butane, or other hydrocarbons, and includes the arm's-length sale of such natural or residue gas by the producer to a gatherer or transporter.

"2. 'Gathering' means the collecting of natural gas from wells of the gatherer or of other producers, its movement to central points by means of pipe lines and other facilities used in connection therewith, its processing and compression as a part of gathering, and includes the arm's-length sale and delivery of such natural gas by the gatherer, prior to the beginning of transportation in interstate commerce within the meaning of the act.

"3. As distinguished from gathering, 'transportation' means the movement of natural gas, after its gathering, through pipe lines and related facilities transmitting natural gas in interstate commerce to the point or points of local distribution for ultimate public consumption, or, after the completion of gathering, to the point or points at which such gas is sold in interstate commerce for resale."

New Electric-Type Drilling Method to Be Disclosed

At Bartlesville, Okla., on June 6, the newly organized Electrodrill Corp. will unfold, via an actual drilling demonstration for the oil-industry press, a radically new method of drilling wells wherein electric power will be directly applied down hole. A pilot unit has been completed after much preliminary development and has been in operation for some time.

Developer and associated with the new company is A. Arutunoff, of Reda Pump Co. The well-known Reda electric motor has been used in the electric submersible type pumping units since 1917, and the forthcoming demonstration may unveil a kindred type of such motor designed for drilling purposes.

According to preliminary reports, the new Electrodrill equipment will incorporate full-hole drilling, coring, and side drill or lateral drilling, casing work, and formation sampling. *(A report of the demonstration will appear in next week's issue of The Oil and Gas Journal).*

Cooperative Gains Control Of Black-Marshall Oil Co.

GREAT BEND, Kans.—Controlling interest in Black - Marshall Oil Co. here has been bought by National Cooperative Refinery Association for a reported price of $7,500,000.

The cooperative is scheduled to take over operation of the company July 1.

Major operations of Black-Marshall are in Barton County, Kansas, but the company is operating also in Ellsworth, Finney, Kearny, McPherson, Rice, Russell, and Stafford counties.

About 210 wells on 70 leases now are being operated, with an aggregate monthly allowable of about 200,000 bbl. For several years the cooperative has been buying the major part of the company's production for its refinery at McPherson.

National Cooperative, of which Howard Cowden is president, owns only one refinery, an 18,000-bbl. daily capacity plant located at McPherson. A majority of the cooperative's stock is owned by Consumer's Cooperative Association, of which Cowden is president also.

Consumer's Cooperative, through its affiliate, Cooperative Refining Association, owns and operates refineries at Coffeyville and Phillipsburg, Kans., and Scottsbluff, Neb.

The Black-Marshall company, an Illinois concern, was incorporated in January 1940, and its general offices were moved from Wichita to Great Bend in 1942.

Texas House Votes June 6 Adjournment

The Texas House of Representatives Monday voted to adjourn June 6, thereby killing the $30,000,000 gas-gathering tax bill and leaving undecided the fate of the unitization bill. The senate was expected to follow the action of the house.

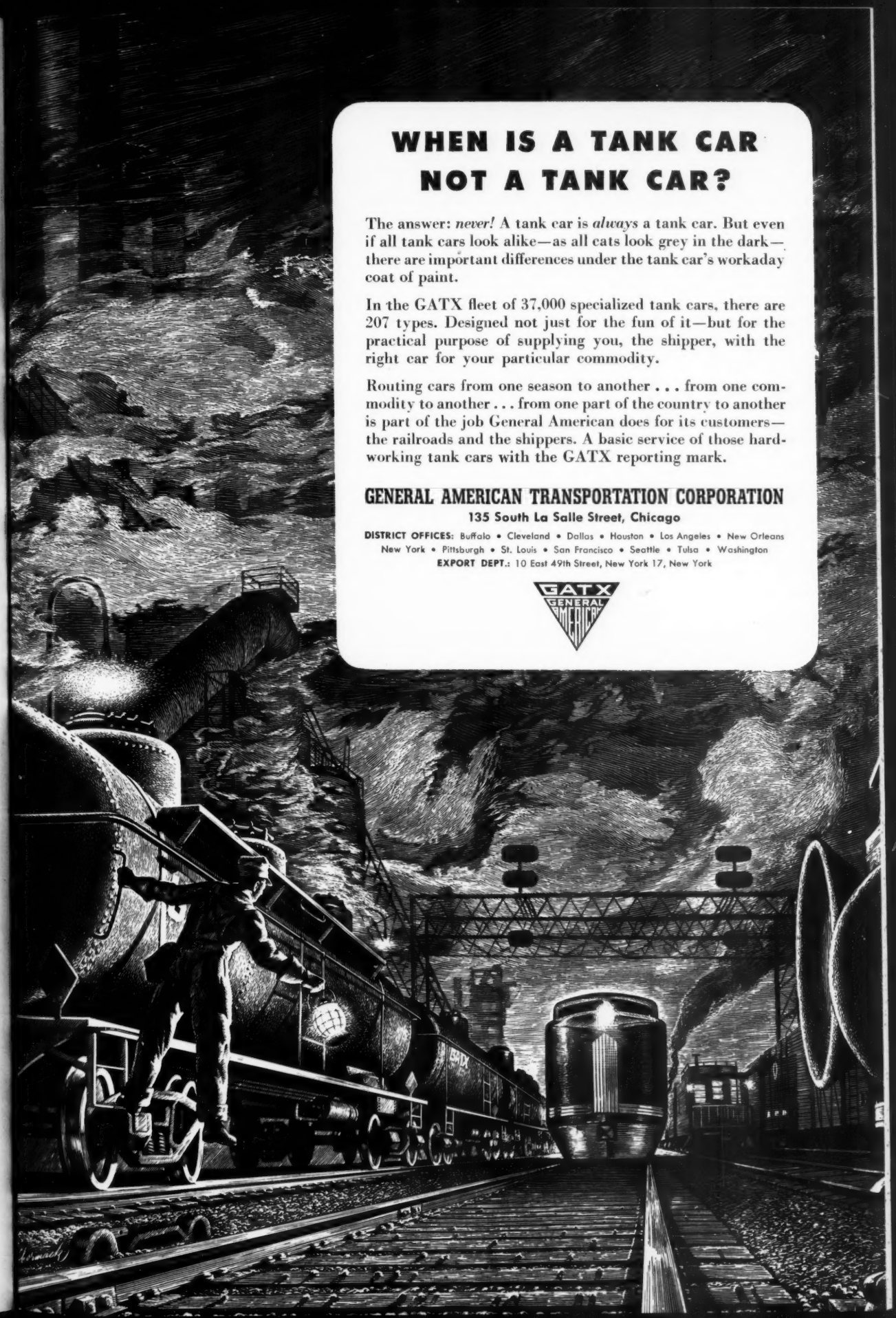
The gas-tax bill had been passed by the house but held up in a senate committee. The unitization bill still was under consideration before the house. The bill, passed by the house with four amendments designed to kill it, had been passed by the senate without the amendments and had gone back to the house for further consideration.

A possibility was seen that the bill might be passed in its present form. If not; the bill will go to a joint conference. If the conference fails to agree on inclusion or exclusion of amendments, the unitization bill will not be passed by this session in any form.

York Sells West Texas Producing Properties

York & Harper, Inc., and Sloan & Zook Co., Bradford, Pa., have purchased all of R. L. York's oil producing properties in Ector and Gaines counties, West Texas, for a sum in excess of $1,000,000, according to an announcement by O. C. Harper, president. The deal involves 97 producing wells in the Foster and Harper fields of Ector County and the Wasson field in Gaines County.

York has retained all his undeveloped properties and will continue in the oil business, with offices in Midland. He disposed of interests with York & Harper last October.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The answer: *never!* A tank car is *always* a tank car. But even if all tank cars look alike—as all cats look grey in the dark—there are important differences under the tank car's workaday coat of paint.
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WASHINGTON WATCHING

BY HENRY D. RALPH

Rizley Bill's Chances

WASHINGTON. — Now that hearings have been completed on all pending bills to amend the Natural Gas Act, industry representatives in Washington confidently expect early action to get a measure before the House for a vote.

Members of the House committee on interstate commerce who participated actively in the hearings certainly appeared convinced that some legislation is necessary to define and restrict the jurisdiction of the Federal Power Commission. The main question is one of time. No definite date has been set for adjournment of Congress, but it probably will be in 60 days or less, which is a rather short time to get a bill through both House and Senate if much opposition develops.

So far there is little opposition to the Rizley and companion bills evident in Congress, but objections to speedy action have been raised which may carry sufficient weight to delay final action until the next session. Committee members may or may not have been impressed with the arguments of FPC Chairman Smith to await the commission's final report on its gas investigation. Smith cleverly played on the committee's vanity by suggesting that of course the committee would want to give amendments as thorough consideration as it gave the original act. This committee prides itself on being the best in Congress and never going off half-cocked, and so far this session it has handled all its legislation with great deliberateness.

Effect of Amendments

The chief cause for delay could be the requests for amendment and changes in wording which have come from various sources, most importantly the National Association of Railroad and Utility Commissioners. This group is held in high esteem by the committee and its amendments were well-reasoned and might appeal to Congressmen who want to make sure that their home state commissions have ample regulatory powers. The prototype of the Rizley bill was carefully drawn by oil and gas industry lawyers, and the inclusion of new language might introduce uncertainties requiring further time in discussion. The FPC and others have pointed out some ambiguities and chances for misinterpretation in the present wording of the bills; changed language might provoke similar questions from the bill's supporters.

On the other hand it may be that the ways have been greased for speedy action without any amendments whatsoever. But if this happens there will be loud cries that the industry has railroaded its bill through without adequate consideration of state utility commissions and gas consumers.

OGD Appropriations

THE fate of the Oil and Gas Division should be known in about a week, as the Senate appropriations committee is due to report out the Interior Department appropriation bill for Senate action within a few days.

As the bill passed the House it contained no funds for OGD, but the Senate committee has been bombarded with statements from oil industry executives urging that the division be continued at least in part.

If the House bill stands it will provide funds only for administration of the Connally Hot Oil Act, and on a curtailed basis. In addition to a reduction of some 40 per cent in the field staff, the funds which may be spent in Washington will be sufficient only for a director, a stenographer, and a statistician. Such a trio would not be continued as a division, but would be incorporated into the secretary's office or some other branch of the department.

Meanwhile NPC committees are at work on assignments given them at the last quarterly meeting, and the presumption is that the council will meet at least once more in any event. The next meeting normally would fall in the middle of July, but the date might be moved up if OGD is forced to liquidate completely.

Tanker Dead-Line

THE tightness in petroleum supplies almost everywhere will be much worse by the end of this month unless Congress takes speedy action to keep in operation some 240 tankers now being operated by the U. S. Maritime Commission under general-agency agreements.

The tanker situation has not changed a particle since February 28 when Congress reluctantly agreed to a 4-month extension of this authority, and now the new dead-line of June 30 is rapidly approaching with no solution in sight. In the absence of new legislation these vessels will be laid up and can be put back into operation only if they are purchased by American citizens. Most oil companies say they have enough tankers for their own use in domestic trades and will purchase more only if they can be transferred to foreign registry.

The prospects that Congress might take some action were further dimmed last week by the sudden death of Rep. Fred Bradley of Michigan, chairman of the House merchant-marine committee. This prevented completion of hearings on a bill to amend the Ship Sales Act of 1946 which included a provision to continue tanker operation by the commission. These hearings were being conducted by Rep. Alvin F. Weichel of Ohio, who now becomes chairman of the full committee. Throughout the hearings Weichel has been quite unsympathetic to continued tanker operations. Legislation has not even been considered on the Senate side of the Capitol.

Sale Dead-Line December 31

As the law now stands, tankers may be sold to citizens and noncitizens alike until December 31, 1947, after which all unsold tankers are to be permanently frozen in the reserve fleet from which they cannot be withdrawn except in a national emergency. However, the joint chiefs of staff have requested the Maritime Commission not to sell more tankers for foreign registry. Some 50 tankers have been sold abroad, and at least that many more probably would be sold for foreign operation if this ban were lifted. The British, among others, would purchase some, and American companies would buy others if they could operate them under the Panamanian flag.

The National Federation of American Shipping has urged a number of amendments to the Ship Sales Act, including three pertaining to tankers: continuation until June 30, 1949, of the commission's authority to operate tankers under general-agency agreements; continuation until June 30, 1949, of the authority to sell tankers to citizens and noncitizens; and extension to December 31, 1949, of the freeze date on all sales and chartering.

The law does not permit chartering government-owned tankers outright, or on a bareboat basis. It has been suggested that such authority be granted, but the Maritime Commission is not very enthusiastic about this because its general-agency agreement is much more profitable. Under this system it has control of the tanker rates and of vessel movements,

whereas under a bareboat charter a tanker might be used hard for a short period and then turned back when business slacks off.

The Navy is most anxious that the commission continue operating the tankers since it does not have sufficient tankers of its own to supply its needs and private operators under the American flag have not responded to invitations to bid on supply contracts for off-shore delivery.

Laying up the commission's tanker fleet would impose a particular hardship on independent distributors along the Atlantic Coast who depend on chartered tankers for their supplies. Its chief effects would be felt abroad, and England, for example, would draw more heavily on Gulf and Caribbean supplies because fewer tankers are required for this movement than from the Persian Gulf.

The Chicago Corp. Decision

THE Federal Power Commission has suddenly become very virtuous about disclaiming its jurisdiction over the production and gathering of natural gas.

On the heels of two decisions that the Fin-Ker company in Kansas and the Whelan partnership in Texas are not under its jurisdiction, FPC has now ruled that Chicago Corp. is not a natural-gas company under the act even though it supplies most of the gas for Tennessee Gas & Transmission Co.

An investigation of the Chicago Corp. was begun in December 1944, and the staff has just completed its findings, which the commission hastened to adopt. These are that Chicago entered an arm's-length contract to supply T. G. & T. with its gas but later T. G. & T. was reorganized and Chicago obtained 81 per cent of its stock and named its board of directors. Still later Chicago sold all of this stock, its directors withdrew from T. G. & T., and the commission finds that at present there is no affiliation or interlocking control between the two companies. During the period of affiliation the original contract was changed in various respects but not the rates for supplying gas. Therefore FPC has concluded that the gas rates were the result of arm's-length bargaining between nonaffiliated parties and that the price of gas to T. G. & T. may be accepted by FPC without question.

Chicago Corp. produces much gas and buys some from others in several fields, maintains an extensive gathering system with processing, dehydrating, and compressor stations, and sells most of its gas to the interstate transmission lines. All of these operations are within the State of Texas and delivery to interstate lines is close to the tail gate of the processing plants.

"It is clear that, although Chicago makes sales of natural gas for resale to an interstate pipe-line company for transportation and sale outside the state wherein it is produced, it has no transmission facilities. It is a company engaged primarily in the production, gathering, and processing of natural gas and the delivery and sale of such gas at the outlets of cycling plants or direct from wells into field or transmission lines owned by others. Such operations are similar to sales made by oil companies of casing-head gas produced by such companies as a part of its oil production."

Had FPC been as explicit in denying its jurisdiction over independent production, gathering, and processing operations at the time it prosecuted its famous Interstate case there would have been much less alarm in the oil and gas industry and perhaps not so much pressure to push through amendments to the Natural Gas Act. Even now this pronouncement should allay the fears of many operators who have hesitated to sell gas to an interstate pipe line.

However, this group of decisions falls far short of satisfying the oil and gas industry. In the first place, there is fear that the commission may be acting only because of the threat of legislation and might change its mind some time in the future if the legislative winds are blowing the other way. In the second place, two of the three cases in this group required lengthly investigations, whereas the industry wants a clear-cut rule that will involve no quibbling or delay. In the third place, these cases do not dispose of all the issues and problems involved. Still uncertain is the situation where an independent producer and gatherer runs his own feeder line a good many miles to tie into an interstate trunk line; FPC may or may not rule that this is "transportation" subject to its regulation.

Most controversial of remaining issues is determination of the field price of gas where the trunk line or its affiliate produces most of the gas or is in position to set the price for the entire field. It is clear that FPC will not voluntarily surrender its claim to the right to regulate such prices even though it does involve control of physical production and gathering.

Senator Moore on Exports

THE administration request for continuation of export controls beyond June 30 is a device to channel needed materials away from domestic consumers, in the opinion of Sen. E. H. Moore of Oklahoma, who dug up some statistics on exports of steel pipe to prove his point.

During the past 20 months, he said, the so-called export controls have operated to permit the shipment to Russia of 50,000 tons of pipe, casing, and oil country tubular goods, sufficient to drill 1,500 wells in the United States or build a 12-in. pipe line from East Texas to Kansas City.

During the first quarter of 1947, his figures showed, exports of seamless and welded pipe to all foreign destinations totaled 82,000 tons, an increase of 411 per cent over prewar volumes. The senator declared that it is significant that the chief materials shortages in this country have developed in items subject to government export controls.

Series of Awards Is Announced by A. P. I.

Outstanding oil men will be recognized for their contributions to the arts and sciences of petroleum production and use in a series of awards announced recently by the American Petroleum Institute.

Five award committees will select candidates, transmit their recommendations to the president of the Institute, who will, in turn, pass them along to the committee on awards with his comments. Final selections will be made before October 1 each year and presentations will be made at the annual meeting of the Institute.

Eight certificates may be presented each year, one each in the divisions of refining, transportation, and marketing, two in the nondivisional committees, and three for the Division of Production.

Men eligible will be those who have "rendered outstanding and extraordinary service" as an officer or member of a division, committee, or other organized unit of the Institute.

A. S. T. M. Plans Fiftieth Annual Meeting in June

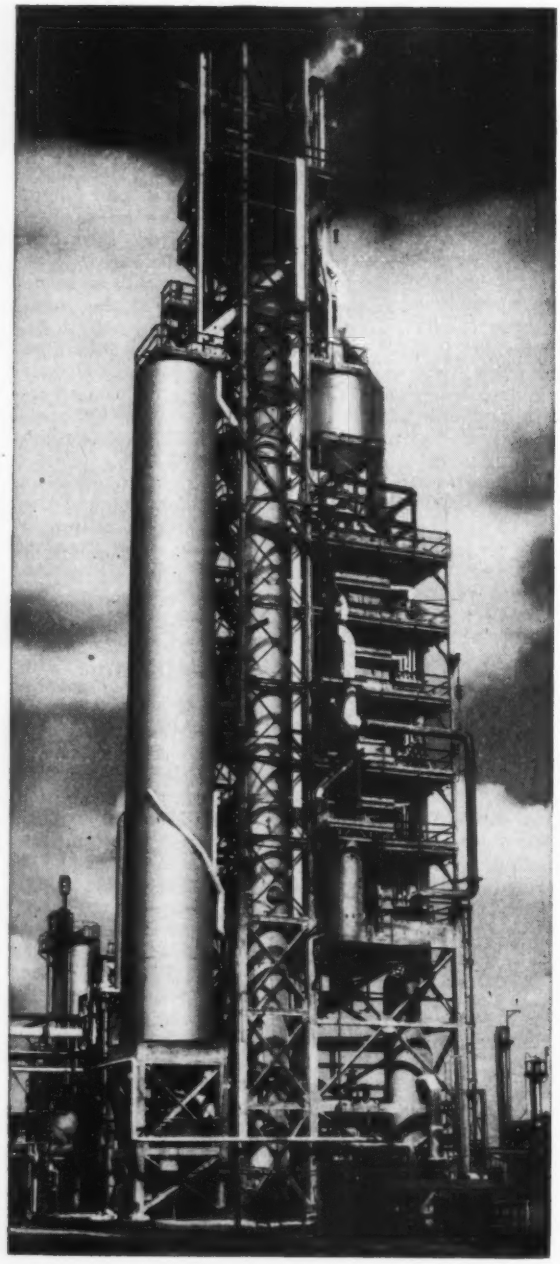
Nineteen technical sessions have been scheduled for the fiftieth annual meeting of the Americcan Society for Testing Materials, which will be held in Chalfonte-Haddon Hall in Atlantic City, N. J., June 16-20.

Of particular interest to petroleum-industry representatives will be a symposium on insulating oil Tuesday afternoon, June 17; a symposium on synthetic lubricants Wednesday afternoon; a symposium on rubber testing Thursday morning and afternoon; and a round-table discussion on the identification of water-formed deposits Thursday evening.

The synthetic-lubricants symposium will include papers on an improved aspirator method for testing laboratory wet-gas meters and on the polarographic determination of tetraethyl lead in gasoline.

About 200 meetings of the society's technical committees will be conducted during the meeting.

New Leonard 3,000 B/D TCC unit now on stream!



FIRST POST-WAR SMALL-SCALE CATALYTIC CRACKER WAS COMPLETED 6 MONTHS AFTER BREAKING GROUND

On March 18, only six months from the time ground was broken, a new 3,000 b/d TCC unit went on stream at Leonard Refineries, Inc., Alma, Michigan and its markedly successful operation is being noted with interest by the entire refining industry.

It is significant that this progressive, rapidly expanding refinery selected TCC equipment for its entry into catalytic cracking. For this new small TCC is the first post-war catalytic cracker specifically designed to meet the competitive needs of the small refiner. Compact but complete, it includes all the essentials of cat crackers many times its size. Yet it is actually simpler, with an integral elevator design so that only one elevator is required for both spent and regenerated catalyst.

Houdry will gladly discuss details of this small TCC with other interested refiners.

HOUDRY PROCESS CORPORATION

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HOUDRY CATALYTIC PROCESSES

March Imports at 504,448 Bbl. Daily; High Export Value Shown

THE United States widened its margin as a new importer of crude petroleum and products in March, but government figures for the month emphasize the comparative high value of the country's petroleum exports.

Daily average imports were reported in a Bureau of Census tabulation as 504,448 bbl. for March. The comparable figure for February was 484,636 bbl. daily.

Despite the fact imports in terms of barrels are greater than exports, the value of exports, largely finished products, is more than twice that of the imports. The Department of Commerce reported value of total imports for March at $22,436,145, compared to $50,081,281 for March exports; imports for the first quarter were valued at $61,461,234 against $135,387,752 value of exports for the first quarter of 1946. Exports include a large percentage of such items as lubricating oils; imports are mostly crude and residual fuel oil.

Average value of crude oil imported during the first quarter was $1.47, and during March, $1.54, a sharp increase over the average of $1.03 in the first quarter of 1946. Higher prices for imported crude reflect the upswing during the past year in United States crude prices to which the price structure of most foreign crude is tied.

During the first quarter of 1947, the Department of Commerce figures showed, imports exceeded exports by 10,218,421 bbl., increasing a postwar trend which first developed late last year. Daily average imports in the first quarter were 502,564 bbl. against 396,888 bbl. in the first quarter of 1946; daily average exports were 389,026 bbl. in the first quarter against 382,115 bbl. in the corresponding 1946 quarter.

Unlike the report for February, the March tabulation gives the barrel equivalent of all types of imports and exports. The February report listed solid and semisolid products separately. The accompanying Bureau of Census tabulation covers only foreign trade of the United States, its territories, and possessions; trade between continental United States and territories and possessions is not included.

Garrett Named District Public-Relations Chairman

Robert E. Garrett, division manager of Gulf Oil Corp., Philadelphia, has been elected chairman of the Middle Atlantic states district to carry out the petroleum industry's public-relations program in the area. He succeeds Osmun Skinner, Van Dyne Oil Co., who has been serving as temporary chairman.

The Middle Atlantic states district includes Pennsylvania, West Virginia, Maryland, Delaware, and the District of Columbia. State chairmen in the area include Fred G. Bannerot, Jr., Elk Refining Co., Charleston, W. Va.; Peyton S. Cochran, Sun Oil Co., Baltimore, Md.; Hugh M. Figgatt, Diamond Ice & Coal Co., Wilmington, Del.; S. A. Parks, Gulf Oil Corp., Washington, D. C.; and Henri Drucquer, Standard Oil Co. of Pennsylvania, Philadelphia, chairman for eastern Pennsylvania.

The five states comprising the southeastern district will be divided into 44 areas to activate more effectively the public-relations program here, it has been announced.

On the divisional basis, Florida will have 6 areas, Georgia 10, North Carolina 14, South Carolina 9, and Virginia 5.

Swensrud Named Executive Vice President of Gulf

Sidney A. Swensrud has resigned as executive vice president of Standard Oil Co. (Ohio) and has been elected executive vice president and a director of Gulf Oil Corp.

S. A. SWENSRUD

Swensrud will assume his duties in Pittsburgh in mid-June. He is expected to give up his present position with Standard of Ohio in Cleveland immediately.

Swensrud, born in Northwood, Iowa, August 1, 1900, joined Standard of Ohio in 1928 as an assistant to President W. T. Holliday. Previuosly he had served a year on the faculty of Harvard University business school, after receiving an M.B.A. degree in 1927 from the graduate school of business there. He had received a B.S. degree in 1923 from the University of Minnesota and had served for a time with Washburn-Crosby Co., now part of General Mills Co., at Minneapolis.

He was named vice president in charge of production, transportation, and supply in 1939 and was elected a director of Standard of Ohio in 1940. He was appointed to his post as executive vice president in November 1946. The office of executive vice president in Ohio Standard's organization will not be filled, and the department heads previously functioning under the executive vice president will report directly to the office of the president, according to an announcement by Holliday. "We are indeed sorry to see Mr. Swensrud leave us," said Holliday, "and our best wishes go with him."

Holliday also announced Earl D. Wallace, vice president in charge of the crude-oil production department of Ohio Standard, has been elected to take the directorship left vacant by Swensrud's resignation.

UNITED STATES PETROLEUM FOREIGN TRADE
(Figures in barrels)

	March	January - March	
Imports:	1947	1947	1946
Crude petroleum	9,387,901	27,105,203	22,494,729
Gasoline	29,007	139,935	58,870
Gas oil and distillate fuel oil	296,856	1,233,384	2,071,558
Residual fuel oil	5,846,307	16,411,802	10,994,264
Unfinished oils	6,325	69,801	.....
Other petroleum products	71,485	270,643	100,519
Total imports	15,637,881	45,230,768	35,719,940
Daily average	504,448	502,564	396,888
Exports:			
Crude petroleum	3,257,249	8,323,484	6,601,693
Natural gasoline	494,642	1,016,698	337,974
Aviation motor fuels	396,792	859,089	2,037,183
Other motor fuels	3,144,838	9,823,670	12,475,695
Kerosene	1,017,237	2,342,128	1,349,880
Gas oil and distillate fuel oil	2,093,152	4,716,383	5,976,019
Residual fuel oil	672,460	2,118,558	1,244,023
Lubricating oil and grease	1,314,802	3,732,244	2,670,359
Paraffin wax	88,779	272,078	174,418
Other petroleum products	613,455	1,808,015	1,523,141
Total exports	13,093,406	35,012,347	34,390,385
Daily average	422,368	389,026	382,115

Source: Bureau of Census; products recorded in units other than barrels were converted as follows: Liquefied petroleum gas, 190 lb. per barrel; paraffin wax, 280 lb. per barrel; coke, 5.6 barrels per long ton; asphalt, 6.16 bbl. per long ton; petrolatum, 280 lb. per barrel; grease, 350 lb. per barrel.

Court Upholds Order Limiting Firm to 6 Per Cent Rate Return

WASHINGTON. — In an important decision under the Natural Gas Act the Circuit Court of Appeals for the District of Columbia upheld the order of Federal Power Commission limiting Mississippi River Fuel Corp. to a rate of return of 6 per cent, but reversed FPC on its findings as to what the rate base should be and remanded it for a new determination.

The company claimed the 6 per cent limit was unfair because 11 previous cases had allowed 6½ per cent for a natural-gas-pipe-line company and there was no warning that a lower rate might be fixed in this case. The court held that notice that the reasonableness of the rate would be considered was sufficient and that the previous cases were not binding. It said the commission was justified in finding 6 per cent sufficient because of the current price of long-term money and that the rate would allow the company to meet its 2½ per cent notes and allow 9½ per cent on its common stock and surplus.

In reversing FPC on its rate-base determination, the court severely criticized the commission for not supporting its conclusions with substantial reasoning and evidence. The chief point in issue was allocation of costs between direct industrial sales and sales of gas to distributing companies. FPC followed the demand-commodity formula which has been approved by the Supreme Court in other cases, but made a number of changes in it as applied to the Mississippi company.

The court said FPC does not need to follow a set formula but if it chooses to deviate from a standard method it must have ample evidence and must explain its reasoning so that the courts may determine whether or not it is properly exercising its discretion. In this case, the court said, FPC did not explain its actions and did not show that its conclusions are supported by substantial evidence. It reversed the order as to allocation of costs and remanded the case with instructions that the commission make clear its methods and make findings of facts, based on substantial evidence, on various disputed cost items.

Gas Technology Short Course Attracts 200

KINGSVILLE, Tex.—About 200 representatives of the oil and natural-gas industries from 11 states attended the second annual short course in gas technology conducted May 27-30 at Texas A. & I. College.

The group heard J. A. Crichton, of DeGolyer & MacNaughton, Dallas, describe as conservative the current estimate of the nation's natural-gas reserves at 151 trillion cubic feet. The figure, he said, could more easily be 200 trillion cubic feet as far as national planning is concerned.

Dr. Drew Mayfield, Celanese Corp., Bishop, Tex., told the registrants that tetrahydrofurane, a versatile solvent and intermediate, is scheduled for quantity production in the near future.

Research work completed and in prospect at the Institute of Gas Technology was described by Capt. E. S. Pettyjohn, institute director. Other general assembly speakers included R. M. Hutchison, research director, Houston Natural Gas Corp., Houston; Frank C. Smith, president of Houston Natural Gas Corp. and president of the A. & I. board of directors; E. N. Jones, president of A. & I. College; Robert R. Suttle, managing director of the Southern Gas Association; Frank S. Kelly, Jr., Arkansas Louisiana Gas Co., Shreveport; and Dean Otto R. Nielsen, A. & I. College.

In the utilization program papers were presented by A. M. Elder, Houston engineer; W. O. Owens, Surface Combustion Corp., Toledo; J. B. Winston, Clark & Winston, Weslaco, Tex.; H. Charles Pierce, Servel, Inc., Evansville; Dr. R. S. Taylor, Servel, Inc.; J. K. Hawk, Evans Engineering Co., Birmingham; I. A. Naman, University of Houston; Dale S. Cooper, Dale S. Cooper & Associates, Houston; and Dr. W. G. Hugly, research director, Southwestern Settlement & Development Corp., Houston.

Trips to South Texas dehydration plants and other gas-consuming installations highlighted the meeting.

Allowables for Three States Are Increased

Increased June allowables for Louisiana, Oklahoma, and Kansas have been announced by regulatory bodies of the states.

In Louisiana Joseph L. McHugh, conservation commissioner, announced a new record allowable of 461,671 bbl. daily, an increase of 16,199 bbl. over May. The Oklahoma Corporation Commission set that state's June allowable at 385,000 bbl. daily, an increase of 6,575 bbl. daily over the April-May allowable, and in Kansas the June figure was set at 285,000 bbl. daily, an increase of 5,000 bbl.

Truman Asks for 4-Year Extension of Compact

WASHINGTON. — President Truman, in a special message to Congress June 2, asked for legislation to extend for another 4 years the Interstate Oil Compact Commission which expires August 1.

He stated that he is encouraged by the fact that 16 states are now signatories, where the original compact in 1935 included only 6 states.

Sen. Carl Hatch of New Mexico immediately introduced a resolution to grant a 4-year extension of the compact.

Esso Tanker Fleet Given Rotating Relief Plan

A rotating relief plan under which unlicensed employes will be granted periods of paid leave equal to one-third of the time they serve aboard a vessel will be inaugurated soon by Standard Oil Co. (N. J.) for workers of its tanker fleet.

The relief plan, negotiated with the Esso Tanker Men's Association, provides that overtime compensation, night relief in port, and annual paid vacations will be discontinued in favor of the new relief arrangement. The plan has been in effect more than a year for licensed personnel and other key ratings.

Truck Movement of Oil Products Shows Increase

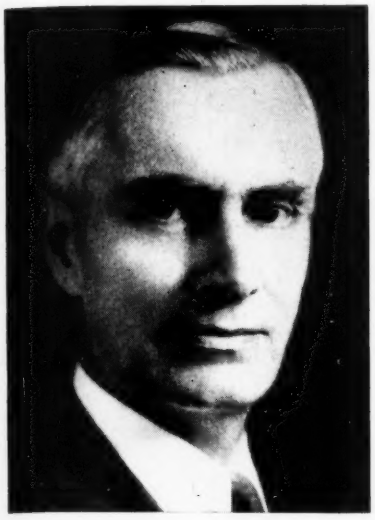
Volume of petroleum products transported by motor freight during April showed an increase of 0.9 per cent over March and a gain of 20 per cent over April 1946, according to a report of the American Trucking Associations, Inc.

Petroleum products accounted for about 8 per cent of the total of 2,436,145 tons of freight hauled by motor carriers during April.

Military Leave to Be Given

Standard Oil Co. (Ind.) has instituted a plan by which employes will be given leave of absence up to 3 weeks a year to participate in Army or Navy reserve or national guard military training. Military pay will be supplemented if necessary up to the employe's regular salary. Similar plans have been announced recently by several other oil companies.

PERSONALS



Lahee Veteran of 29 Years With Sun Oil

DR. FREDERIC H. LAHEE, 62, newly appointed research counsellor of the production department of Sun Oil Co., has been associated with the company since 1918 and has been Sun's chief geologist for the last 27 years.

Born in Hingham, Mass., Lahee completed both undergraduate and graduate studies in geology at Harvard University. He received an A.B. degree in 1907, an M.A. degree in 1908, and his doctorate degree in 1911.

He became an instructor at Massachusetts Institute of Technology in 1912 and assistant professor of geology there in 1915, continuing in that capacity until 1918, when he joined Sun.

The new research counsellor is best known for his book, "Field Geology," used widely for many years as a textbook for geology students.

He has been a member of the committee on crude-oil reserves of the American Petroleum Institute since its formation in 1936 and chairman of the committee since the death of J. Edgar Pew several months ago.

He was organizer and first chairman of the committee on the application of geology and on statistics of exploratory drilling of the American Association of Petroleum Geologists.

During the war he served as chairman of the committee on explorations for District 3 of the Petroleum Administration for War.

C. D. Read, formerly chief engineer for British American Oil Co.'s refining department in Canada, is now general manager of Wood River Oil & Refining Co. at Hartford, Ill. **J. A. O'Neill,** formerly manager at Wood River Oil & Refining, has been transferred to Wichita, where he is purchasing agent at the headquarters of the company there.

W. A. Parker, Southern Natural Gas Co., Birmingham, Ala., has been promoted from corrosion engineer to assistant superintendent of pipe lines.

John Biegel, former process engineer for Union Oil Co., in Wilmington, Calif., has joined Tarr & McComb Oil Co., Ltd., Los Angeles.

Russell V. Johnson has opened an office as a consulting geologist in the Mercantile Building in Denver.

Robert B. Campbell, consulting geologist of Gulf Hammock and Miami, Fla., was elected vice president of the Southern Association of Science and Industry at the group's annual meeting in Birmingham May 27.

R. H. Hargrove has become president of Texas Eastern Transmission Corp., succeeding **E. Holley Poe** who continues as a director and in a consulting capacity. Hargrove has resigned from his former position as vice president and general manager of United Gas Pipe Line Co. **E. R. Cunningham,** formerly general superintendent of main lines for United Gas Pipe Line Co., has become vice president in charge of operations of Texas Eastern Transmission Co.

DR. UTTERBACK

Dr. D. D. Utterback, district geologist for Houston Oil Co. of Texas, has been elected president of the New Orleans Geological Society. He succeeds **Dr. Gordon I. Atwater. Joseph Hudson,** geophysicist for Humble Oil & Refining Co., was elected vice president, and **D. Nelson Rockwood,** district geologist for Union Producing Co., was elected secretary-treasurer.

L. A. Cranson, director, was elected to the new post of executive vice president of Honolulu Oil Corp. at the recent annual meeting of stockholders in San Francisco. **Thomas C. Moroney** was named secretary to succeed **Robert H. Wright,** who will retain his vice presidency.

Paul Miller, former assistant department head of the light-oils division in the Texas City refinery of Pan American Refining Corp., has been appointed head of the new coordination and economics department in the operating division. Miller has been succeeded by **Winston Peeler,** whose former post as assistant department head of the cracking division is being filled by **Frank Webb, Jr.**

Francis E. Heath, chief petroleum engineer and assistant chief geologist in the Dallas division of Sun Oil Co., has been appointed division chief geologist. **A. S. Rhea,** formerly assistant to Heath, has been named chief petroleum engineer in the division.

A. S. RHEA

Donald K. Stewart, senior engineer in the Los Angeles basin division of Shell Oil Co., Inc., has been named division production foreman. In other production-department changes, **Roy V. Mahaffey,** cathead man, has been promoted to driller, and **Edmund L. Richardson,** subforeman, has been promoted to shop foreman, both in the Los Angeles basin division. Other Shell West Coast promotions and transfers, all in the exploration department, include: **Myrl W. Hurley,** from junior micropaleontologist to micropaleontologist, Long Beach; **Paul S. Pustmueller,** from geologist to senior geologist, Ventura; and **Walter A. Stokesbary,** from micropaleontologist to senior micropaleontologist.

Richard W. French has been appointed assistant to the vice president in charge of production and chief engineer of Standard Oil Co. (Ohio). French will take direct charge of the production department's staff organization of engineers, will have charge of the production laboratory in Oklahoma City, and will represent the company in over-all research programs dealing with crude production. Prior to joining Standard of Ohio, French served for 14 years with Continental Oil Co.

Ronald J. C. McArthur, chief operator, experimental plants, for Shell Development Co., has been promoted to pilot-plant foreman at Emeryville, Calif. Other changes include **Delmar L. Brussard,** from supervisory operator to assistant pilot-plant foreman,

PERSONALS

Emeryville; and **Earl F. Augustine, Frank C. Chance, Luther T. Fogerty,** and **Harry T. Gillis,** all from shift supervisor, experimental plants, to assistant pilot-plant foreman, Emeryville.

H. G. CALDER

H. Gordon Calder has been named president of Southern Production Co., Inc., producing affiliate of Southern Natural Gas Co., Birmingham, Ala. Before joining Southern Natural as vice president and manager in 1937, he served with various utility companies in Mexico, Cuba, New York, and Pennsylvania. Elected new vice presidents of Southern Production were **John M. Starke, Jr.,** and **Roy C. Williamson.** All three new officers are members of the board of directors which is headed by **C. T. Chenery** and also includes **Howard T. Ellwood,** secretary-treasurer.

J. M. STARKE, JR.

R. C. WILLIAMSON

William F. Beuck and **West Robbins,** Superior Oil Co. geologists, recently arrived in Colombia on a business trip.

Granville C. Berlin, land and geological scout for Chartiers Oil Co., has resigned effective June 1 to become an independent operator.

W. G. L. Linsell, head of industrial relations for Cia. Petroleo Shell de Colombia, recently left Bogota for a 4-month vacation in Scotland.

E. B. Stewart, district superintendent at Edmond, Okla., for Ohio Oil Co., has been transferred to the Cement district at Pauls Valley. He will be succeeded at Edmond by **Carl Tapscott.**

Jacob Koopman, assistant chief draftsman, has been placed in charge of the design and drafting division of the Esso engineering department of Standard Oil Development Co. He will act as chief draftsman in the absence of Leo W. Schrader. **John E. Donahue** and **David B. MacClymont** have been appointed assistant chief draftsmen.

Kurt deCousser, chief geologist and Michigan superintendent for Socony-Vacuum Oil Co., Inc., has been appointed to a 3-year term on the Michigan State Oil Advisory Board to succeed **C. C. Irby. Edward J. Bouwsma,** Muskegon Development Co., was reappointed to a second term.

J. Paul Rogers, district production engineer at Duncan, Okla., for Lone Star Gas Co., has been transferred to Dallas as assistant field supervisor of production and drilling. **George B. Miller,** district engineer at Shamrock, Tex., for 12 years, is succeeding Rogers at Duncan.

William D. MacInnes has joined the Beacon Laboratories of The Texas Co., Beacon, N. Y., as a chemist. MacInnes graduated earlier this year from the University of Michigan.

Dr. G. Herzog has been appointed director of research in charge of the Bellaire laboratories of the producing department, The Texas Co., Houston, effective June 1. Dr. Herzog, who originally entered the service of The Texas Co. in February 1940, received his Ph.D. degree from the Swiss Institute of Technology at Zurich, Switzerland, in 1928, majoring in physics.

G. G. Oberfell Given Honorary Degree

THE contributions of Dr. G. G. Oberfell in the petroleum research field were recognized May 27 when he received an honorary doctor of science degree from the University of Tulsa at the university's fiftieth commencement exercises.

Oberfell is vice president in charge of research and development and a director of Phillips Petroleum Co., Bartlesville, Okla. A native of Ohio, he was educated at Miami University, Oxford, Ohio, the University of Chicago, and the University of Pittsburgh. He taught in Miami University's chemistry department and in Ohio rural schools and worked for Ohio Fuel Supply Co.

From 1912 to 1916, he was a chemist with the United States Bureau of Mines, and during the first World War served as a captain in the Chemical Warfare Service. After the war, he became research engineer with Chesnut & Smith, Inc., later a consulting engineer, and in 1924 going with Hope Engineering & Supply Co.

Since 1925, Oberfell has been with Phillips, first as director of research and since 1933 vice president in charge of research and development. He has directed and conducted research in such fields as carbon-black manufacture, drilling-mud additives, copper sweetening and catalytic desulfurization, volatility control of motor fuel, and the charcoal-adsorption testing method. In 1939 he received the Hanlon Award presented by the Natural Gasoline Association of America.

Dr. G. G. Oberfell, left, receiving a doctor of science degree at the University of Tulsa; Dr. Paul Zurcher, associate professor of petroleum refining, and W. L. Nelson, head of petroleum refining at the university and technical editor of The Oil and Gas Journal

G. R. Van Landingham, district chief clerk at Hobbs, N. M., in the production department of Humble Oil & Refining Co., has been named assistant division chief clerk at Midland, Tex. He is being succeeded at Hobbs by **M. L. Weatherall,** district chief clerk at Denver City, Tex. **A. D. Eady,** assistant district chief clerk at Wink, Tex., has been appointed district chief clerk at Denver City.

DR. HERSBERGER

Dr. Arthur B. Hersberger, divisional director of research for Atlantic Refining Co., has been elected chairman of the Philadelphia section of the American Chemical Society, succeeding **Floyd T. Tyson,** Temple University professor of chemistry.

C. M. Ross, geologist for Amerada Petroleum Corp., has been transferred from Duncan, Okla., to Roosevelt, Utah.

Dewitt T. Tarlton, Jr., gravitymeter computer for Carter Oil Co., has been transferred from the Tulsa laboratory to Venezuela.

Kenneth Aid has been transferred by Barnsdall Oil Co. to Denver to become Rocky Mountain division geologist. He recently returned from an assignment with Barnsdall in South America.

H. M. Staggs has resigned as manager of the engineering and operating department of Atlantic Refining Co. to become a drilling contractor in West Texas. He has been succeeded by **John Marston.**

Ralph Copley, Denver, assistant division production superintendent for The California Co., retired June 1.

Carroll Cook, geologist, Standard Oil Co. (N. J.), has been in Colombia inspecting field operations of Tropical Oil Co.

John S. Redfield, geologist with Stanolind Oil & Gas Co., Tulsa, for 12 years, has been named assistant secretary of the Geological Society of America. He will assume his new duties in New York in June.

George H. Schoenbaum, who joined Standard Oil Co. of New Jersey as a student engineer 17 years ago, has been appointed overseas technical representative for the Standard Oil Co. (New Jersey) with the responsibility of following the quality of petroleum products in the company's foreign markets. His headquarters will be in London. **H. L. Baker,** Cranford, N. J., will succeed Schoenbaum as engineering representative of Standard of New Jersey in Detroit. He joined Standard Oil Development Co. in 1942 in the lubricants group of the research division of Esso laboratories.

Shifts

Lloyd H. Harder, superintendent, Rocky Mountain Drilling Co., Coalinga to Winter, Calif.; **John Biegel,** engineer, Union Oil Co. of California, Hermosa Beach to Los Angeles; **Evan Watts,** foreman, Magnolia Petroleum Co., Cuba to Blanco, N. M.; **J. C. Stansbury,** engineer, Phillips Petroleum Co., Hobbs, N. M., to Goldsmith, Tex.; **L. Decker Dawson,** foreman, Republic Exploration Co., Plainview, Tex., to Fairview, Okla.

Clyde T. Massey, engineer, Humble Oil & Refining Co., Corpus Christi to Victoria, Tex.; **L. E. Brister,** engineer, Gulf Oil Corp., Goldsmith to Wickett, Tex.; **E. N. Duram,** engineer, Shell Oil Co., Inc., Graham, Tex., to Centralia, Ill.; **R. K. Winters,** engineer, Atlantic Refining Co., Odessa, Tex., to De Ridder, La.; **Tom Gaines,** engineer, The Texas Co., Orange to Daisetta, Tex.; **James C. Conner,** engineer, Stanolind Oil & Gas Co., Monroe, La., to Oklahoma City.

Ralph Thom, foreman, Magnolia Petroleum Co., Yazoo City, Miss., to Kilgore, Tex.; **Eugene Stebinger,** geologist, Standard Oil Co. of N. J., New York to Palo Alto, Calif.; **Roger P. Lisher,** engineer, Shell Oil Co., Inc., Hoisington, Kans., to Davenport, Iowa; **G. A. Gresham,** superintendent, Helmerich & Payne, Inc., Ulysses to Garden City, Kans.; **Ben A. Burdette,** engineer, Socony-Vacuum Oil Co., Inc., Augusta, Kans., to Casper, Wyo.; **J. Y. Haslam,** engineer, Skelly Oil Co., El Dorado, Kans., to Tulsa.

O. H. Hall, foreman, T. M. Deal, Hays to Burrton, Kans.; **W. W. Heathman,** superintendent, Union Oil Co. of California, Wichita, Kans., to Olympia, Wash.; **Vaugh W. Russon,** geologist, Sinclair Prairie Oil Co., Hobart, Okla., to Rocky Ford, Colo.; **C. L. Berryhill,** engineer, Gulf Refining Co., Stillwater to Pryor, Okla.; **P. E. Cosper,** superintendent, Skelly Oil Co., Velma to Wilson, Okla.; **C. H. Robinson,** superintendent, Skelly Oil Co., Wilson to Velma, Okla.

DEATHS

Henry V. Smith, 80, retired Pennsylvania drilling contractor, died May 24 at his home in Bradford, Pa.

H. S. Leever, 60, chief clerk for The Texas Co. and an employe of the company for about 35 years, died May 26 in a Houston hospital.

Frank Payne, 56, Allegany field (New York) driller, died at his home near Bolivar, N. Y., May 25.

John J. Kenney, 72, driller, died May 26 at his home in Bradford, Pa.

William Kunstadter, treasurer of California Texas Oil Co., Ltd., died in California May 29.

Henry L. Snyder, 85, consulting engineer and active in the oil industry from 1888 until his retirement, died May 27 at his home in Wilkinsburg, Pa.

William Wood Lake, 71, who retired in 1941 as a bookkeeper with The Texas Co. after 26 years' service, died May 25 in a Houston hospital.

William M. O'Reilly, retired drilling superintendent, died recently at his home in Bradford, Pa. He had been associated with several American and British oil companies and had served many years in Latin America and Europe before his retirement.

G. L. Kothny, 66, vice president and general sales manager of Sperry-Sun Well Surveying Co. and a well-known inventor of industrial equipment, died May 28 in a hospital at Bryn Mawr, Pa.

Ralph T. Baker, 52, former oil editor of the Daily Oklahoman, Oklahoma City, and at one time a member of the editorial staff of The Oil and Gas Journal, died May 29 in Manhattan, Kans.

Charles A. White, 52, assistant district manager in Oklahoma for Sinclair Oil Co., died May 31 in Oklahoma City.

George Everett Kegler, 38, chief engineer at Wink, Tex., for Humble Pipe Line Co., was killed in an automobile accident May 24 near Kermit, Tex. He had been associated with Humble since 1925 and lived in Hobbs, N. M., from 1930 until 1943.

Leslie M. Curtis, 67, independent operator who in 1916 organized the old Okeah Oil & Gas Co. and who was instrumental in opening Keystone field, near Tulsa, died May 27 in a Tulsa hospital.

"Biggest Inch"

EMPLOYS ADVANCED IDEAS *Laying* LARGE LINES

H. C. Price, president, James P. Neill, vice president, H. C. Price Co., and W. D. Pitkin, chief inspector of the desert spread for Southern California Gas Co. and Southern Counties Gas Co. Inset, top left, is Paul Reed, pipe-line editor, The Oil and Gas Journal, who watched construction operations for laying 30-in. pipe near Desert Center and March Field, Calif.

by Paul Reed

THE "Biggest Inch" 214-mile 30-in. natural-gas pipe line now being laid for the Pacific Lighting Corp. group, consisting of Southern California Gas Co. and Southern Counties Gas Co., between Blythe and Santa Fe Springs, Calif., is unusually significant for several reasons. This line, which is to receive West Texas gas from the 26-in. line now being laid to Blythe by El Paso Natural Gas Co., is part of the first pipe-line system to connect the Mid-Continent with California.

The $4,000,000 contract awarded to H. C. Price Co. for laying the entire 214 miles is believed to be the largest lump-sum contract for a pipe-line construction project in the United States.

Because this project is initiating a trend in pipe-line economics toward lines of 30 in. and larger for both natural- gas and petroleum, there is keen interest throughout the industry in the early phases of this first 30-in. gas-transmission line which happens to be the first high-pressure line of this diameter. Built as a pioneering undertaking across southern California, special provisions have to be made to handle the unusually large diameter of the pipe and to deal with difficulties of the varied terrain.

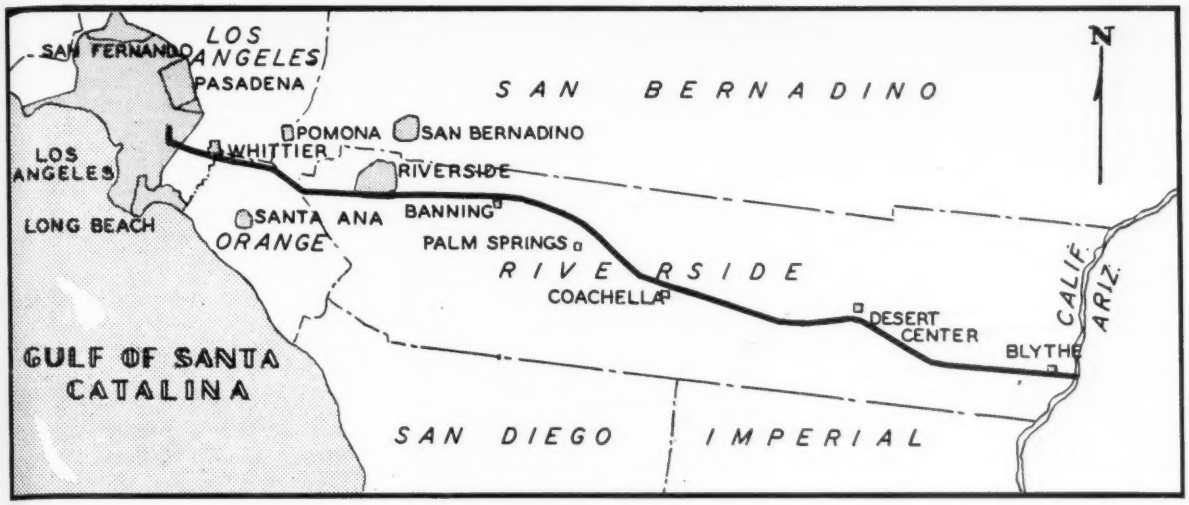
Among the advanced construction features, which will be discussed later in this article, there are three which are attracting special attention:

1. The unusual development and application of a new type of automatic electric traveling internal lineup clamp which has proved to be vital to the success of the job.

2. Gamma ray inspection applied for the first time throughout a major gas-line project has already displaced customary welding inspection and has established a practice which promises to be widely used in future pipe-line construction.

3. Slight bends are made by the modern cold-wrinkle method; more acute bends are formed by a unique method of slicing factory bends on

Mechanically operated internal line-up clamp saves time which is important for maintaining high rate of progress in laying 30-in. pipe



Map of the route of the 214-mile 30-in. natural-gas pipe line being laid for Southern California Gas Co. and Southern Counties Gas Co. across California. This line will receive gas from El Paso Natural Gas Co.'s 26-in. line being laid which will transmit West Texas and New Mexico gas to Blythe, Calif.

the right-of-way immediately before installation.

"In undertaking the laying of the first 30-in. gas line ever laid, we fully realized that many unanticipated problems would be encountered," James P. Neill, vice president, H. C. Price Co., said in discussing the project. "Now that more than 90 miles have been laid, representing 45 per cent of the job, we find this prediction to be true. Preliminary studies made it possible to eliminate some threatening hazards; on the other hand, certain contingencies have arisen which could not be foreseen in handling this unusually large pipe; these problems had to be coped with and solved immediately."

Information for this article was obtained during a visit to the project with Neill and H. C. Price, and through consultation with M. M. Laulhere, construction engineer for the Pacific Lighting Corp. group.

C. S. Le Noir, general superintendent, is in charge of pipe-line construction operations for the Price company.

Construction in the desert at the eastern end of the project was pushed during the cooler months of winter and spring by a spread under W. B. Williams, superintendent, which has now progressed 81 miles from Blythe to the fig-raising desert area near Indio. A second spread, supervised by R. K. Shivel, superintendent, working now in the vicinity of the Army's jet-plane post at March Field, has laid approximately 17 miles, and will continue through the orange grove area near Riverside, across the Chino Mountains and on to the pipeline terminus at Santa Fe Springs.

The project traverses nearly every type of terrain, including sand-rock, desert, swamp conditions of high water-table irrigated land, orange groves, canals, city streets, bad lands, and mountains. Part of the desert crossed was used to train General Patton's division for desert warfare prior to the North African invasion. Because of its similarity to Arabian desert, these operations serve as a proving ground for 1948 Trans-Arabian pipe-line construction. Temperatures have been already up to 119° F. and will be 130° before leaving the desert.

For working in the desert country all-wheel drives are necessary for all trucks.

Pipe-line crews are scheduled to reach the mountainous areas in August and September.

In a stretch of 150 miles of the California desert route not a single fence was encountered; in fact, for the entire 214-mile route of the 30-in. line, it is anticipated that no more than 10 fences will be found. Furthermore, there was no timber to cut. Desert right-of-way has been cleared at the rate of 5 miles daily. Right-of-way was cut for the entire route by a single right-of-way crew, equipped with 10 D-7 and D-8 angle dozers, which has now completed its work. In the Chino Mountains a cut was

Pipe-gang operations near the Army Air Forces' March Field from which jet planes seen in the sky had just taken off. Large standard tractor equipment handles 60-ft. joints of 30-in. pipe which are added to the line by the stovepipe method

Right: Gamma ray photograph of weld being taken. Film is held around the weld by belt during exposure to rays from 400-mg. radium capsule; this capsule is removed from the interior of the pipe by means of the handle protruding upward. Above: Examination of gamma ray photographic negatives of welds near X-ray Engineering Co.'s traveling laboratory on the pipe-line right-of-way in the vicinity of welding operations. Gamma ray inspection has eliminated customary welding inspection for this project

made more than 350 ft. deep and 500 ft. in length.

Stringing by Dunn Brothers Co., the only subcontractor on the job, is done by the unusual procedure of trucking direct from the mill. Pipe trucks equipped with special racks having 1-in.-thick rubber padding take coated and wrapped, 30-in. pipe in 60-ft. lengths, from the Bechtel interests' yard (adjacent to Consolidated Steel Corp., Los Angeles plant) for the haul out to the point on the right-of-way where it is delivered.

The yard-applied protection consists of coal-tar enamel and a wrap of 15-lb. felt paper. To protect the coating from the effect of heat from the sun, it is whitewashed with a spray on the right-of-way. Whitewash serves to reduce temperatures 20° to 50°.

Each spread has two No. 48 Buckeye ditchers. Hard digging is done by 14 drag-line back hoes of ½-yd. and 1½-yd. Lima, Buckeye, and Ensley types.

Caving occurred in an 11-mile stretch of alluvial deposits west of Blythe. Throughout most of the route there has been little caving as a result of using slopers on the sides of the ditcher wheels cutting 2 ft. down and 1 ft. back.

For digging through decomposed granite, new-type removable hard-surfaced bucket teeth are used which must be replaced at intervals as frequent as 150 ft. In sections of the bad lands there will be an 18-ft. ditch.

All bends less than 10° are made by cold-wrinkle bending with a C-R-C power-operated machine. Each wrinkle bends the pipe approximately 2°; wrinkles are 30 in. apart. Bends of more than 10° are made by installing factory bends which are cut from 90° tube turns at the location of installation by means of a specially designed beveling machine. An engineer marks joints with bending data in advance of the bending gang.

Probably the most unusual equipment on the project is the electrically powered, mechanically operated Price-Elliott internal lineup clamp of a new type just introduced in the work. This travels continually through the pipe under its own power which also expands the shoes that press against the inside wall of the pipe during lineup operations. With this device 30-in. lining up and welding are done at a rate (under the best conditions) as fast as a joint every 3 minutes. All hand work for hammering out dents is eliminated.

Welding Procedure

In welding the 30-in. pipe the stringer bead is applied by four welders in each spread. First, two welders weld their segments; then the remaining segments are welded by the other two. For completing welds for the stovepipe procedure followed, there are 12 to 14 bell-hole welders in each spread. All welding machines are Lincoln diesel-powered units; most of these are of the 200-amp. type; for the heavier pipe 300-amp. units are used. Wall thicknesses are 9/32, 10/32, 11/32 and 12/32-in. for overland sections of the line; at river crossings pipe has ½-in. wall thickness.

Fleet weld No. 5 rods are used: 5/32-in. for stringer beads; 3/16-in. for the two final beads. Special attention has been given to the requirements of welding this pipe which has a high manganese content of 0.85-1.25 per cent. Welds are completed with weld metal protruding above the pipe so slightly that it is almost flush with the pipe. This is in accord with a procedure practiced by pipe lines in California, which provides a stronger weld than welds with weld metal protruding to the customary height.

For welding in the desert during sand storms special shelters for welders will be provided with open tops.

Gamma ray inspection of welds by X-Ray Engineering Co. enables company's organization closely to watch the quality of welding operations so that trends which require correction or adjustment can be observed readily. This is especially valuable for maintaining the quality of the stringer bead which is of much importance. At the beginning of the job, welders were originally qualified by the usual tests. Now only gamma ray data are used; customary welding inspection of the line has been eliminated since results have indicated the value of relying completely on gamma ray information.

Gamma Ray Inspection

Each spread is accompanied by a gamma ray laboratory with facilities for developing a photographic negative of a weld so that a complete report can be submitted by the X-Ray engineer within an hour after initial exposure.

The procedure is to wrap slightly overlapping strips of specially protected film around the weld; film is exposed to rays from a 400 mg. radium capsule inserted through a 1-in. hole in the top of the pipe (about 6 in. from the weld), to the interior center of the pipe. The exposure is made for 30 minutes; developing takes 30 minutes. The film strips are 16 in. long and 6 in. wide; these are fitted into a belt strapped around the pipe during exposure.

Ten per cent of the welds made by each welder are inspected. In those cases where corrective welding is indicated by gamma ray inspection, it is usually only necessary to chip out a few inches of weld metal in a short section of the weld which is then rewelded.

Pipe is welded on skids 10 ft. back from the ditch. Lowering in is done by six tractors for each spread, three D-7's and three D-8's. It has been found that a D-7 with its shorter boom requiring working closer can be safely used within 8 and 10 ft. of the ditch without danger of caving. For handling the heavy pipe, special 24-ply fabric and rubber slings are required.

Although the construction organization of the gas company has concluded from numerous studies that minimum provision for expansion and contraction is needed, a practice has been followed of using a slack wallop every 2,000 ft. on level ground.

River crossings are laid 10 ft. below dry stream beds with pipe of ½-in. wall coated, with cement 2 in. thick, applied by the Gunite method. With this weight for ballasting no river clamps are needed.

This line is leading the way in establishing 30-in. pipe for a new era of pipe lining for crude-oil and natural-gas lines, inaugurated by this radical departure from the customary practices of the industry.

Helicopter Aids Oil Search

Helicopter Air Transport, Inc.'s, Bell Model 47-B helicopter as it arrived in Louisiana from Camden, N. J. Note wheels and low ground clearance

by Charles J. Deegan

A HELICOPTER has been used successfully and economically for the first time in geophysical exploration work in the petroleum industry. It may have been the first use of a helicopter for any purpose in the petroleum industry. The Robert H. Ray Co., a geophysical contracting company of Houston, and Helicopter Air Transport, Inc., of Camden, N. J., joined forces in this first successful venture.

The Ray company had a contract to do exploratory gravity-meter work for one of the major oil companies in the vicinity of Houma, La., in a marshy territory. Normally marsh buggies would have been used for this work. In this case the lessee would not permit use of marsh buggies for fear they would destroy the muskrat runs and otherwise interfere with the animals' normal activity. (Muskrat fur is important business in this area.) The decision was made to try the helicopter.

In spite of the usual troubles that accompany any pioneering venture, the results have been so successful, that if comparable results can be maintained use of helicopters will result in a unit cost per gravity station of only about one-third the cost of similar work using marsh buggies.

On a basis of the work done thus far, the Ray company believes it may be able to get gravity readings at 600 stations per month at an overall cost of $15,000, or $25 per station reading. Comparison of records of similar operations with marsh buggies indicates average costs ranging from $65 to $75 per station.

The rental cost of the helicopter is $75 per hour, but with a minimum charge of 80 hours per month, ($6,000). This includes the services of a pilot and mechanic, with fuel, lubricants, and maintenance, borne by the helicopter contracting company. Since flying a helicopter is more difficult and tiring work than piloting a plane, current experience indicates it may be advisable to have a second pilot available to take advantage of good

Geophysical company and Helicopter men: Eugene Frowe, head of research laboratories; F. E. Stapleton, survey engineer; M. K. Sellers, observer; B. S. Darnall, party chief, all of Robert H. Ray Co.; Fred Feinburg, pilot, Peter Wright, contract department, and Joseph Kosner, mechanic, all of Helicopter Air Transport, Inc.

Helicopter modified for operation in swamps or on water. Pontoons give more ground clearance than wheels. This keeps the anti-torque propellor at the tail high enough to clear swamp grass. Doors have been removed

flying weather. Four hours per day is a good day's work for a helicopter pilot.

The sequence of operations is shown in the pictures accompanying this article. The speed of operations is amazing, an elapsed time of as little as 5 minutes having been recorded from one station to the next. The best record to date is 19 stations in 2½ hours (150 minutes).

Obtaining Position Fix

The surveying work necessary to locate the position of the observation points is simplified by the fact that elevations can be ignored in the flat swampy terrain. Position fix is obtained with a triangulation check by using three engineers to shoot angular direction on the helicopter from three different points. These are shot when the helicopter descends vertically for a reading. Each engineer records the time with his angular observation. This necessitates keeping watches synchronized, but no trouble has been experienced with this. Maximum distance of these shots is about 6 or 7 miles.

When the work is proceeding rapidly, it does not take long to work beyond the range of sight of the engineers on the towers. Therefore two men are kept busy continually building new towers ahead of the work.

Thus far it has been possible to build these towers along streams, so that the construction materials can be hauled in by boat. Later it may be necessary to fly both men and materials into the interior of the swamp by the helicopter. This will be expensive and undoubtedly will slow up the work.

The helicopter is a comparatively slow vehicle compared to an airplane. Much time is lost if it is necessary to fly from the field to base for refueling and then back to the field. Wherever possible it is advisable to arrange for refueling from a boat which can travel on the waterways to a nearby point.

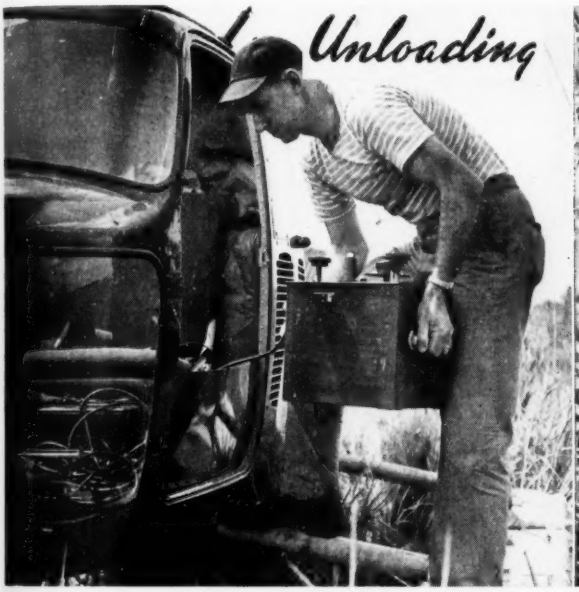
As in all airborne operations, weather is a considerable factor in determining total time required and therefore total cost. In this area it is believed that 40 stations can be run on a normal flying day and that there will be on an average, about 15 flying days per month. This would produce 600 stations per month, at an estimated over-all cost of $15,000, or $25 per station.

***Right, top:** Helicopter takes off, to fly to location*

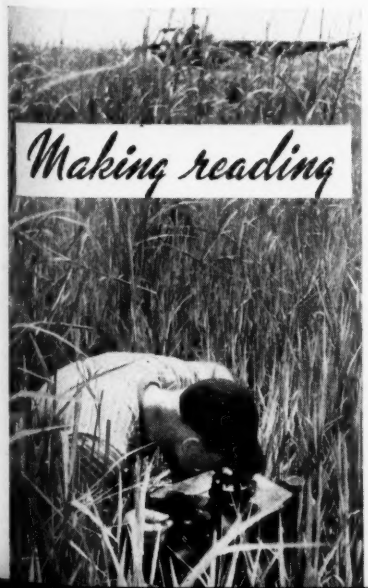
***Right, center:** Preparing to land to take a gravity-meter reading. Note that air stream from the large rotor blades flatten out swamp grass to the rear, aiding in keeping tail rotor clear*

***Right, bottom:** On the ground, ready to go to work*

Left: Closeup of helicopter on the job. Pilot Fred Feinburg sits on right and operates controls. Right: Closeup of left side, showing Eugene Frowe holding gravity meter on his lap



Left: Frowe has stepped out on pontoon, and is lifting gravity meter out. Right: Frowe has removed gravity meter, tripod, and battery from helicopter and is just about set up for routine swamp reading



Left: Helicopter has flown about 200 ft. away and set down again. Engine is kept running to avoid loss of time required for rotor blades to stop and start. Helicopter is parked at distance so its vibration won't interfere with gravity meter. Right: Survey engineer on observation tower takes a bearing on the helicopter (out of the picture) as it descends vertically to a gravity meter station. Three engineers at separate points take bearings on each station, recording time and bearing. The watches of all three are synchronized. This permits accurate position fix of each station

Right: Robert H. Ray, president of the geophysical company

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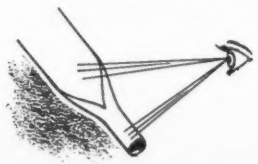

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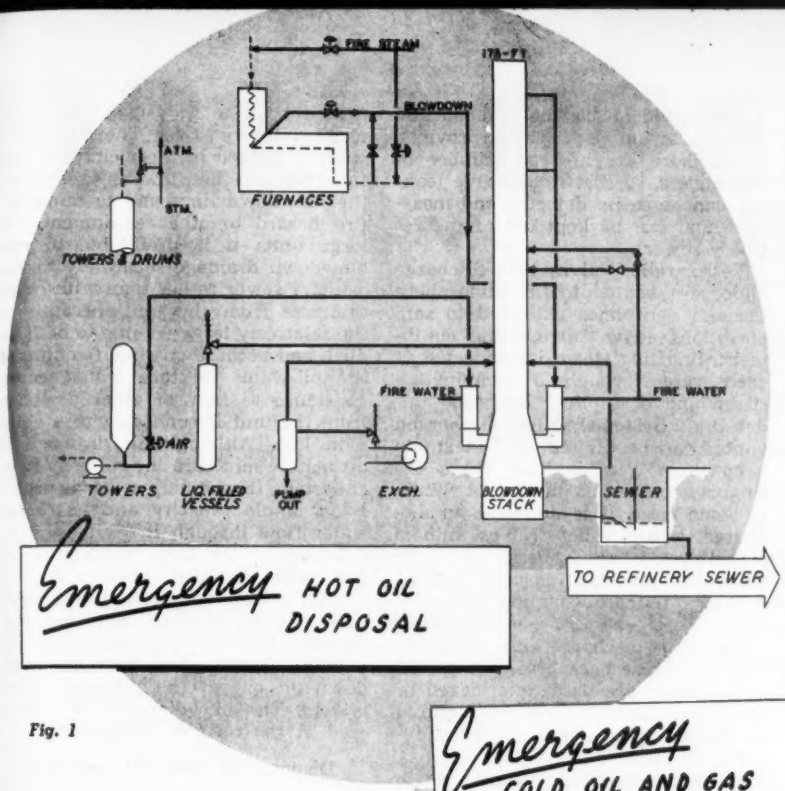


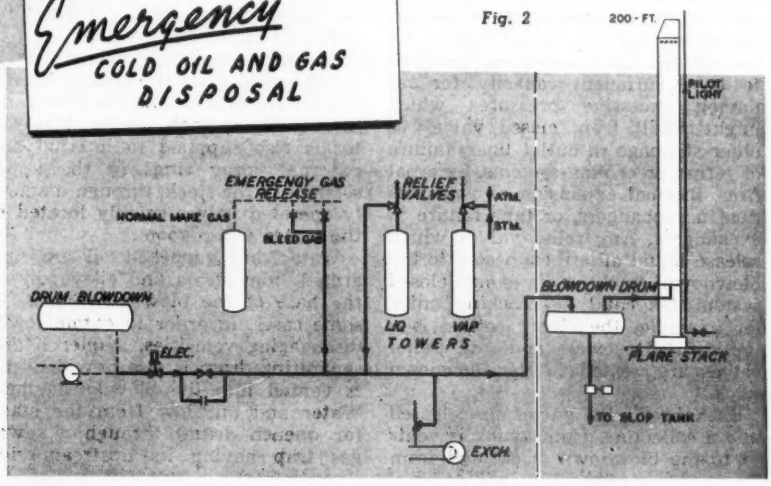
Fig. 1

leased into a system where they are cooled by quenching with water, the liquid and vapor are separated, the liquid is released into the refinery sewer, and the vapor is vented to the atmosphere through a stack. Gases and cold oils of higher vapor pressures are released into a drum which is vented through a flare stack. Any gas entering the drum and any vapor released in the drum are burned at the top of the stack, and the liquid is pumped out of the drum to tankage outside the unit. Cold oils at low pressures are simply pumped out directly from the process vessels to tankage, and do not require any special blowdown facilities.

Disposal of Hot Oil

A diagrammatic arrangement of facilities for emergency disposal of hot oil on catalytic cracking units is shown in Fig. 1. This system is typicar for most types of units processing hot oil.

Fig. 2



Fundamental Requirements for SAFE ARRANGEMENT OF OIL DRAINS AND VENTS

by J. H. Johnsen *

IN this discussion it is intended to illustrate the principles involved in the various types of blowdown and drain and vent systems employed, rather than to furnish a complete description of the facilities provided for any particular unit.

In case of a fire or other emergency condition that necessitates quick removal of oil from process equipment, two types of blowdown facilities are available, the choice depending primarily on the temperature and vapor pressure of the stocks being handled. Hot oils of low vapor pressure are released into a system where they are cooled by quenching with water, the liquid and vapor are separated, the liquid is released into the refinery sewer, and the vapor is vented to the atmosphere through a stack. Gases and cold oils of higher vapor pressures are released into a drum which is vented through a flare stack. Any gas entering the drum and any vapor released in the drum are burned at the top of the stack, and the liquid is pumped out of the drum to tankage outside the unit. Cold oils at low pressures are simply pumped out directly from the process vessels to tankage, and do not require any special blowdown facilities.

The furnace can be blown down by opening air-motor-operated valves in the blowdown line from the convection section. The radiant section can be drained or blown down through manually operated gate valves in connections from the transfer lines. The furnace can be cleared by admitting steam through air-motor-operated valves to either the furnace-inlet line or the furnace-outlet transfer line. In the latter case steam flows back through the radiant section into the blowdown line.

All air-motor-operated valves on the unit are operated from a central control station, located to give maximum safety and accessibility. In this case the operating station is located on an inside wall of the control room. Air-motor rather than electric-motor-operated valves are used because they can better be designed to withstand high temperatures resulting from an external fire, and because they would not be incapacitated by possible electric-power failure during the emer-

*Assistant head engineer, engineering department, Whiting, Ind., refinery, Standard Oil Co. (Indiana). A paper presented at joint technical meeting of Standard Oil Co. (Indiana) and subsidiaries, French Lick, Ind., May 5-9, 1947.

gency. Insulated housings are provided around the air-motor-operated valves for protection during a fire.

Air-motor-operated valves are generally provided in the blowdown lines from the convection section as shown in Fig. 1, or in blowdown lines from the furnace inlets in order to remove as much liquid oil from the furnace tubes as possible. However, in cases where there is a large volume of material at high pressure downstream of the furnace, as in a thermal-cracking-unit soaking drum, automatic blowdown from the transfer line may be provided.

Hot-oil towers are generally blown down through air - motor - operated valves in blowdown lines from the pump suction line leading from the bottom of the tower. The motor-operated valves are located as close to the suction line as possible to avoid long dead ends which might plug upstream of the valve.

In addition to the above-described blowdown facilities for furnaces and towers, relief valves can be considered as an emergency means for disposing of hot oil. Relief valves on vessels and exchangers are designed to have sufficient capacity for relieving excessive pressures which might result from closed valves or other stoppage in outlet lines, failure of reflux or cooling systems, external fires, thermal expansion or vaporization in exchangers, or tube failure in exchangers. Any relief valves which release liquid oil are connected to the blowdown stack or to some closed system. On catalytic cracking units, for example, the slurry settler is a liquid-filled vessel, and the relief valves are vented to the blowdown stack.

Exchanger relief valves are released into a collecting drum which is vented to the blowdown stack, and from which liquid oil can be pumped out. Such a drum is usually provided when there are a large number of exchangers, so that relief-valve leakage can be easily detected and measured and can be kept out of the refinery sewer.

Vessel relief valves that discharge vapor are vented to the atmosphere through vent lines extended to safe elevations above surrounding equipment. Snuffing steam is connected to each vent through a combination steam and drain line (described under Drain Systems) so that discharged vapors can be diluted with steam to keep them from igniting or to extinguished fires at the vents. While in some cases it is desirable to discharge vapor relief valves into a closed system, atmospheric venting is generally provided because of its simpler discharge piping arrangement. If a closed system is used, rather large discharge lines are needed to minimize back pressure; if dual relief valves are used, interlocked or three-way shutoff valves are required in the discharge lines to allow removal of either relief valve.

Air-motor-operated valves which are operated from the central control station are provided in the fire-water lines to the quench nozzles. Fire water is also supplied to internal and external spray rings in the upper sections of the stack, through manually operated valves usually located in the water pump room.

Water and quenched oil are separated from steam and oil vapors in the base of the blowdown stack. In some cases, in order to obtain lower disengaging velocities, a quench and separating drum is also provided and is vented into the blowdown stack. Water and oil flow from the stack (or quench drum) through a sewer gas trap having its upstream side vented back to the stack, and then to the refinery sewer. The blowdown stack is located in the vicinity of the furnaces and hot towers to shorten the blowdown lines and to minimize fire hazard to other equipment. On large units it is preferable to run blowdown drainage separately to the refinery sewer rather than with other drainage from the unit, because of the relatively large volume to be handled, and because possible foaming of the oil-water mixture would cause resistance to flow of other drainage from the unit if connected to a common line. Although all drainage is ultimately mixed in the refinery sewer system, the refinery sewer is usually of ample capacity and has some water flow through it.

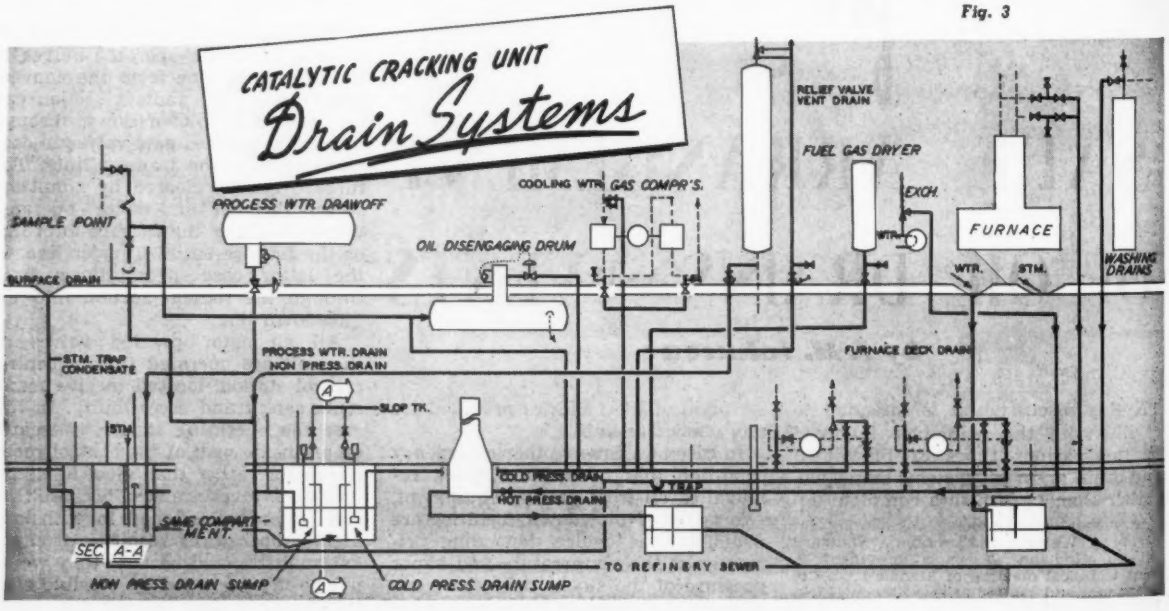
Owing to the large volume of oil and water handled when a unit is blown down, and considering that units are not blown down very frequently, it is usually impractical to install facilities for keeping blowdown oil out of the refinery sewer system. The blowdown oil is recovered at the refinery separators.

Disposal of Cold Oil and Gas

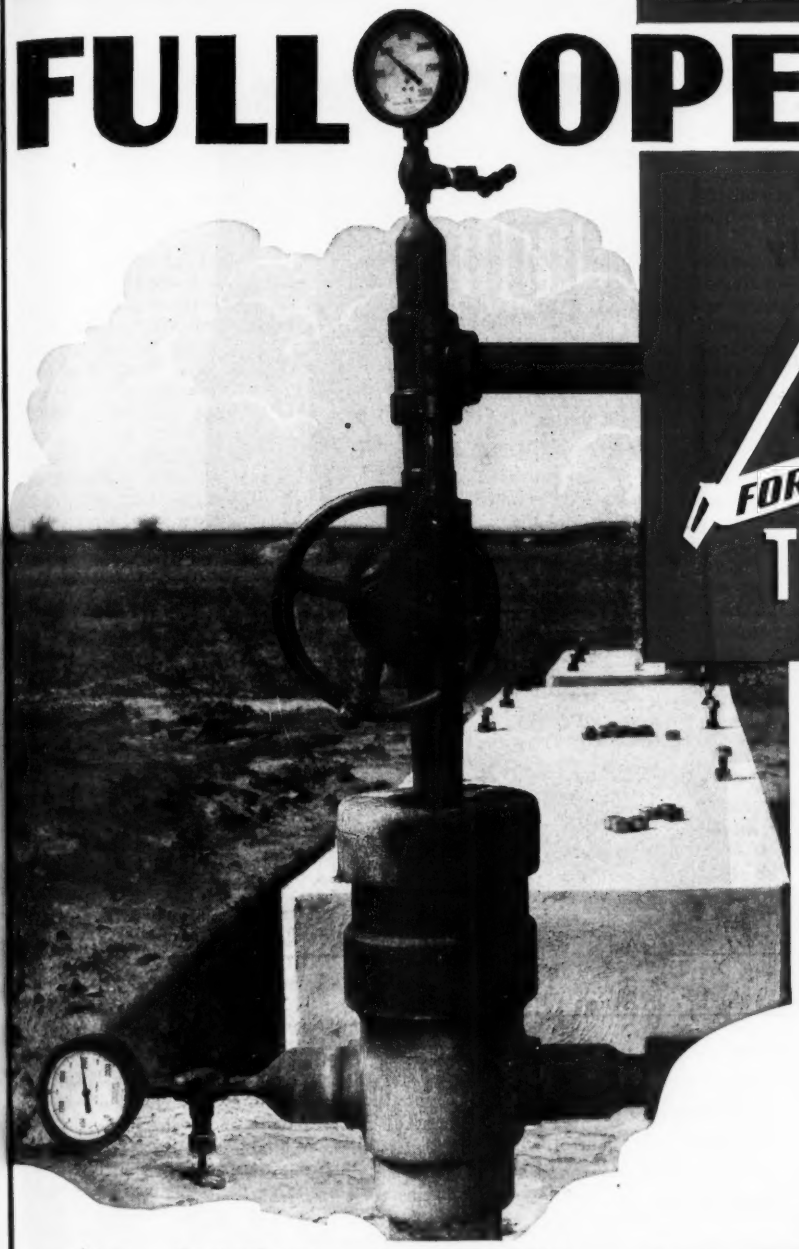
Cold oil at low vapor pressures (about 12 lb. R.v.p. or less) is usually disposed of by simply pumping it out of the unit to a suitable storage tank. In some cases low-pressure cold oil is pumped through a gas-release tower outside of the unit before going to tankage. The gas-release tower is vented to a flare stack or into a refinery gas-collecting system.

Fig. 2 shows diagrammatically a typical blowdown system for disposing of light materials on vapor recovery and polymerization units. The liquid oil is released into a blowdown drum provided with an external steam heating coil, to aid in vaporizing the light fractions and re-

Fig. 3



FULL OPENING



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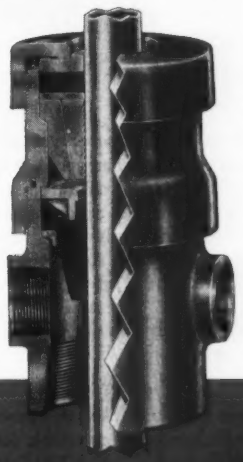

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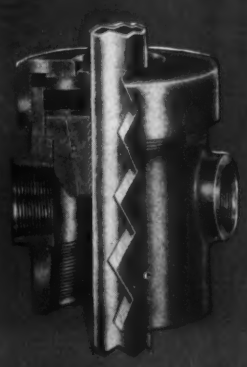

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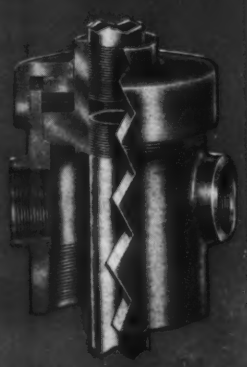

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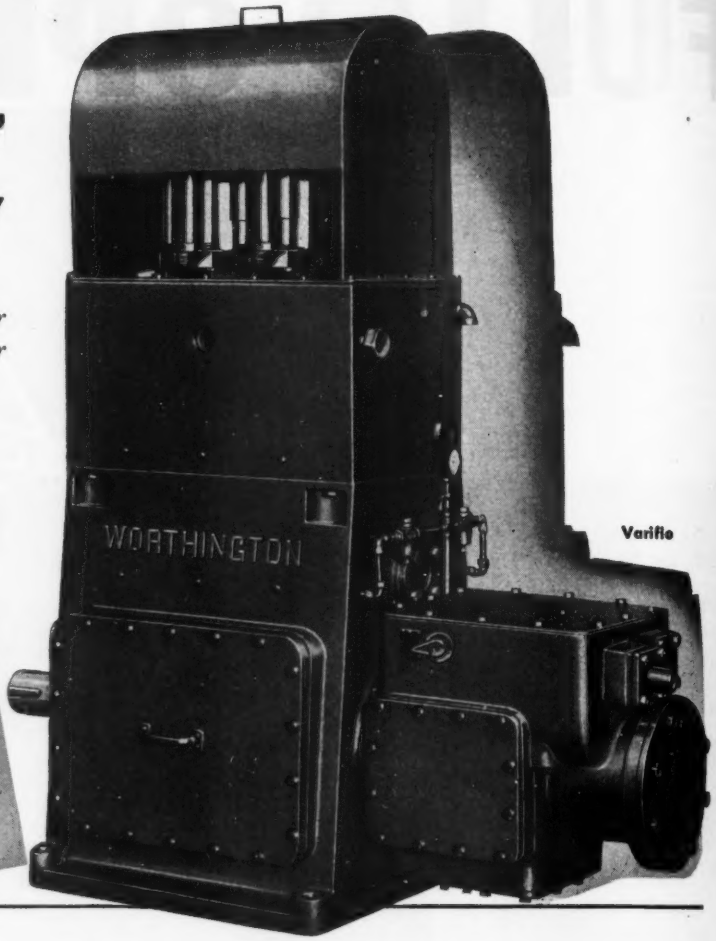

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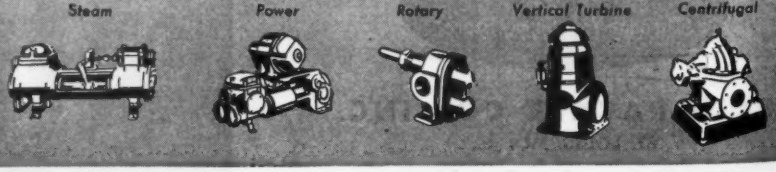


ducing the vapor pressure to a point where the liquid can be pumped to field storage. The vapors leaving the drum enter a flare stack 200 ft. high, 24 in. in diameter, and reduced to 16 in. at the top. A pilot flame, which is always kept burning, ignites the vapors as they leave the top of the stack. The top swaged section, 9 ft. long, is made of 18-8 chrome nickel steel to withstand the high temperature. A flame arrestor consisting of four layers of 40-mesh wire screen is provided near the top of the stack to prevent flame travel back through the stack in case of low gas velocity. Electric heating is provided to prevent plugging of the wire screens with ice. As further insurance against backflash, a small amount of off gas from the unit is bled into the stack continuously through a restriction orifice to keep air from entering the stack by "breathing." If the pilot light should go out, it may be relighted by a flame traveling up a series of gas jets inside of an open pipe, with a spark plug for igniting the lowest jet. Another method of lighting used on some units is by a gas flame propagated inside of a closed pipe by mixing gas and air and igniting the mixture with a spark plug.

The blowdown drum and flare stack are located a safe distance from any unit—usually about 300 ft. or more, if space is available. On units where very light materials, such as propane, are blown down it is possible to get quite low temperatures in the blowdown header and in the line between the unit and the flare system. Low-nickel-alloy steel pipe is used in some cases to provide sufficient impact strength at these low temperatures.

The typical arrangement shown for drum blowdown is used for disposing of oil in towers and drums which, after pumping out through coolers, would still have too high vapor pressure to handle in tankage outside the unit. On the Whiting vapor-recovery unit, for example, there are three such drums: the absorber feed accumulator, the lean-oil still-reflux drum, and the depropanizer-reflux drum. The blowdown lines for these drums originate in the suction lines of the respective pumps inside of the pump room, and rise through the pump room to the electric-motor-operated valves located on the roof. The motor-operated valves are located at the high points in the lines so the downstream sides will drain into the blowdown header. Heated housings are provided to prevent freezing of the upstream lines in cold weather. Downstream of these valves there are restriction orifices with gate valve bypasses before the individual lines enter the blowdown header. The restriction orifices are sized so that, with the bypasses closed, the three drums can be blown down simultaneously without exceeding the estimated flare-burning capacity of 750,000 cu. ft. of gas per hour. If only one drum is to be blown down, the restriction orifice could, of course, be partially bypassed. The operator would be guided by the appearance of the flame at the top of the stack in determining how far to open the bypass.

The blowdown drum is sized to hold all the liquid remaining after flashing the contents of the three drums to atmospheric pressure, assuming normal operating levels in the drums initially. When this is not the case, it is necessary to hold off blowing down some of the vessels until some liquid can be pumped out of the blowdown drum. In either case, high-level alarms are provided to warn the operators that the drums are filling up.

While the various vessels in the unit are being blown down as described above, vessels containing material of sufficiently low vapor pressure after cooling are pumped out. In order to shut off reboiler steam to towers as quickly as possible, a solenoid valve operated from a remote push-button station is usually provided to vent the instrument air to the reboiler steam-control valve and thus close the valve.

Another use of the blowdown system is as an emergency outlet for off-gas streams leaving the unit in case of a stoppage of the off-gas line, or in case use of the normal gas line is impossible for other reasons. A manually operated gate valve is provided in the emergency gas-release line.

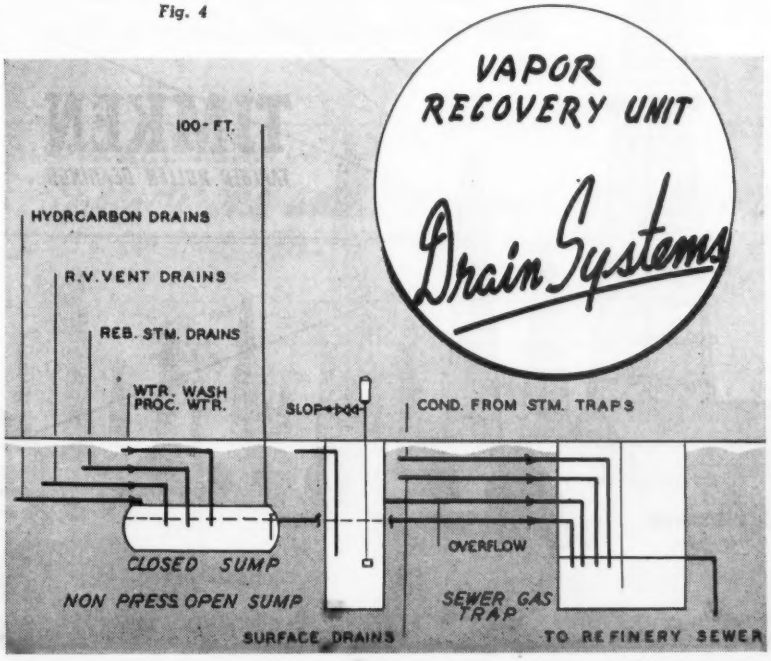
Safeguard Against Failures

A similar emergency gas-release system is provided in the make-gas line to the suction of the gas compressors on catalytic cracking units, but in this case a control valve is provided which is set to open at a predetermined pressure a few pounds above the normal gas-compressor suction pressure. Thus, if there should be a compressor failure or if the suction pressure should go up to the setting on the control valve for any other reason, make gas will automatically be released to the flare. Because of the relatively low operating pressure of catalytic cracking units (about 5 psig. at the compressor suction), and their dependence on proper pressure differentials across the catalyst slide valves, this is an important safety feature.

The blowdown system is also used to dispose of material released from relief valves on liquid-filled vessels. Relief valves that discharge vapor are ordinarily vented to the atmosphere at a safe elevation to eliminate the additional pipe and valving necessary to connect them to a closed system, as has been discussed under emergency disposal of hot oil.

Where feasible, exchanger relief-valve vents are piped into the blowdown system, as shown in Fig. 2. However, since the blowdown lines are designed to drain to the blowdown drum, the blowdown line in the unit is usually rather high. In order to keep from pocketing the relief-valve discharges—and thus introducing a freezing hazard, the relief valves must be located above the blowdown line. This may necessitate rather long lines between the exchangers and relief valves, as well as additional platforming for access to the relief valves. Consequently, in some cases exchanger relief-valve

Fig. 4



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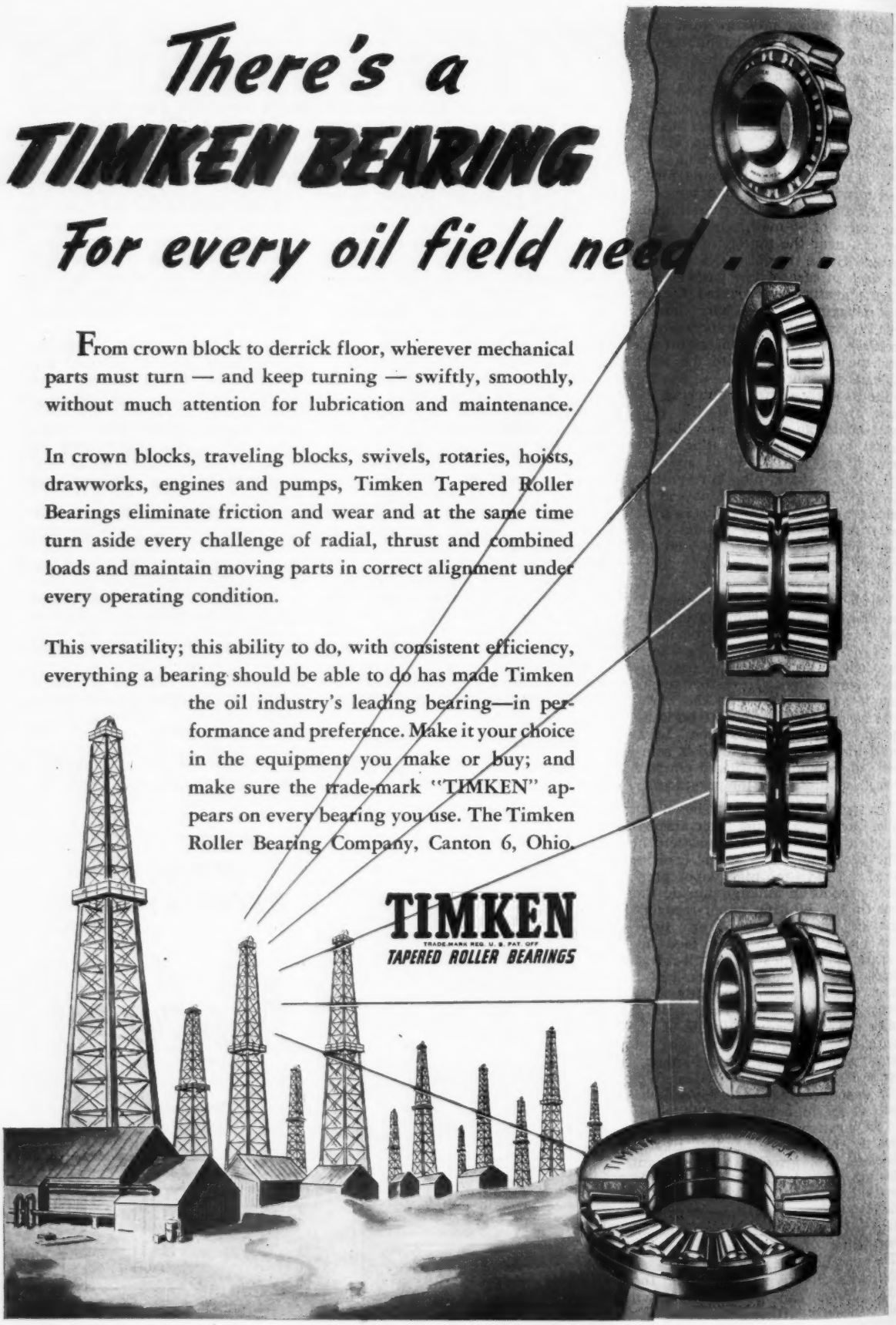


vents are piped to the closed drain system through an underground header.

It has been the practice to provide relief valves on exchangers for protection against excessive pressures which could result from vaporization or liquid expansion (due to blocking off the cold side before the hot side is cooled), tube failure, or external fire. On units now being designed (for Casper), however, relief valves are not being provided on exchangers where needed only for external fire, such as on the hot-oil side of exchangers where the hot side is at the higher pressure. In this case it would be necessary for the hot-oil side to be blocked off during a fire in order to build excessively high pressures, and this is not considered very likely.

Drain, Vent, and Pumpout Systems

The purpose of drain, vent, and pumpout systems provided on process units is to afford a means for safely disposing of oil and gas in lines and equipment as required during normal operation and during starting-up and shutting-down periods, and to keep as much of the oil and gas as possible out of the refinery sewer system. The systems provided necessarily vary with the types of unit, although there are a number of features common to most units.

Drain Systems for Catalytic Cracking Units

Fig. 3 shows diagrammatically the drain system provided for catalytic cracking units, and includes the following:

1. Cold-oil pressure drains are collected in an entirely closed system from the pressure source to disposal point. They include drains from the following:

(a) Cold-oil pumps, for draining when shutting down, bleeding off the discharge for priming the pump, bleeding off the suction to eliminate water during the startup, etc.

(b) Gas-compressor suction, interstage, and discharge piping for draining during startup.

(c) Fuel-gas and other similar dry drums for draining small quantities of accumulated oil. Where there are larger quantities of oil to handle, such drums are connected to the pumpout system and pumped either to storage or to some process vessel.

(d) Drain lines from relief-valve atmospheric vents to drain any liquid leakage through the relief valves.

(e) Oil accumulation in the cooling-tower water-disengaging drum. In case of oil leakage into the water in shell and tube coolers, the oil and gas is accumulated in this drum and automatically drawn off through a control valve operated by interface-level control.

(f) Connections for flushing out the sampling system before drawing a sample.

The cold-oil pressure drains are discharged into a separating sump which is vented to the blowdown stack, and a sump pump is provided to pump the oil slop to tankage.

2. Hot-oil pressure drains are also collected in an entirely closed system from pressure source to disposal point, and are kept separate from the cold-oil pressure drains to avoid vaporization of light oil and water in the piping. Materials at temperatures higher than about 250° F. are generally put in the hot pressure drain system. The following drains are included:

(a) From hot-oil pumps, which are drained for the same reasons as given under cold-oil pumps.

(b) From the water-side relief valves of hot-oil coolers where oil-side pressure is higher than water-side pressure. In case of a tube failure, the relief valves would discharge hot oil.

(c) Washing drains from the top of furnaces and towers. Although these are not actually hot-oil drains, some oil may be present in the wash water and there is too much water for the cold pressure drain sump pump to handle. It is therefore put into the hot pressure drain header to disengage any oil vapor in the base of the blowdown stack before releasing to the sewer.

The hot-oil pressure drains are discharged to the base of the blowdown stack. Where this is not convenient a separate sump and water-quench system are provided.

3. Nonpressure drains are collected in open funnels and run into vented collecting sump, and normally include drains from bearing brackets (packing leakage) on pumps, from oil-sample connections, from telltales at various points, from atmospheric equipment, from sample-room sinks, etc. Usually hot-oil nonpressure drainage is not of sufficient quantity to warrant a separate system, and all nonpressure drainage is handled in a common header. If the nonpressure drain lines are properly sealed in an adequately vented collecting sump, it is possible to use the sump for both cold pressure drains and nonpressure drains. However, because of the possibility of excessive pressures being developed in the sump by the release of large quantities of light oil through the cold pressure drains, it is preferable to collect the nonpressure drainage in a separate sump as shown in Fig. 3. Running traps are provided in nonpressure drain lines leaving buildings, as indicated in the nonpressure drain header from the cold and hot-oil pumps in Fig. 3, to keep gas from other sources from backing up in buildings. Atmospheric vents are provided between traps to keep from gas binding the system.

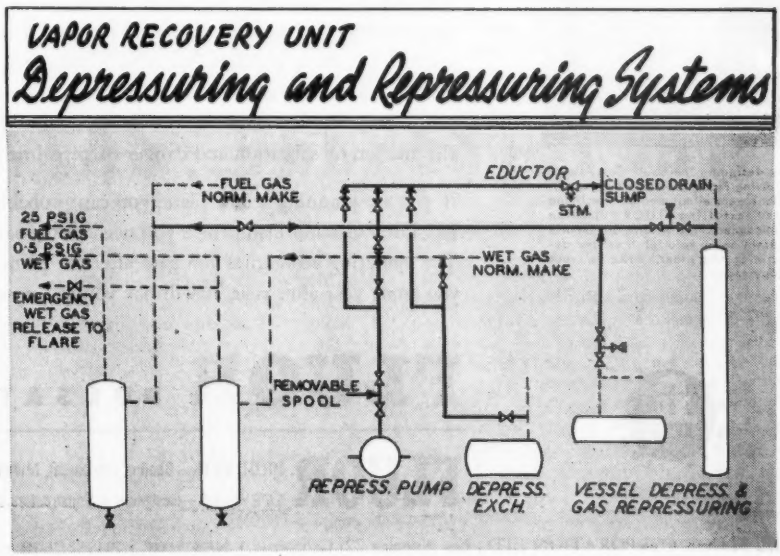
Both the pressure and nonpressure drain sumps are provided with sealed emergency overflow pipes to the refinery sewer system in case of sump pump failure.

4. Drains for oil-bearing water are routed into a section of the sewer box downstream of the nonpressure and pressure drain sumps, but upstream of the outlet section of the box. In this case the only oil-bearing-water drain is from process-water drawoff. A steam line is provided to heat up this section of the sewer box in order to vaporize as much light oil as possible before the water is released to the refinery sewer.

On some units process-water drawoff is piped to the closed drain sump for recovery of large quantities of oil

(Continued on page 95)

Fig. 5



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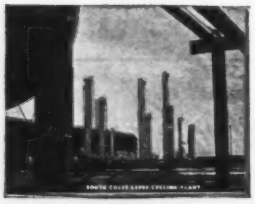

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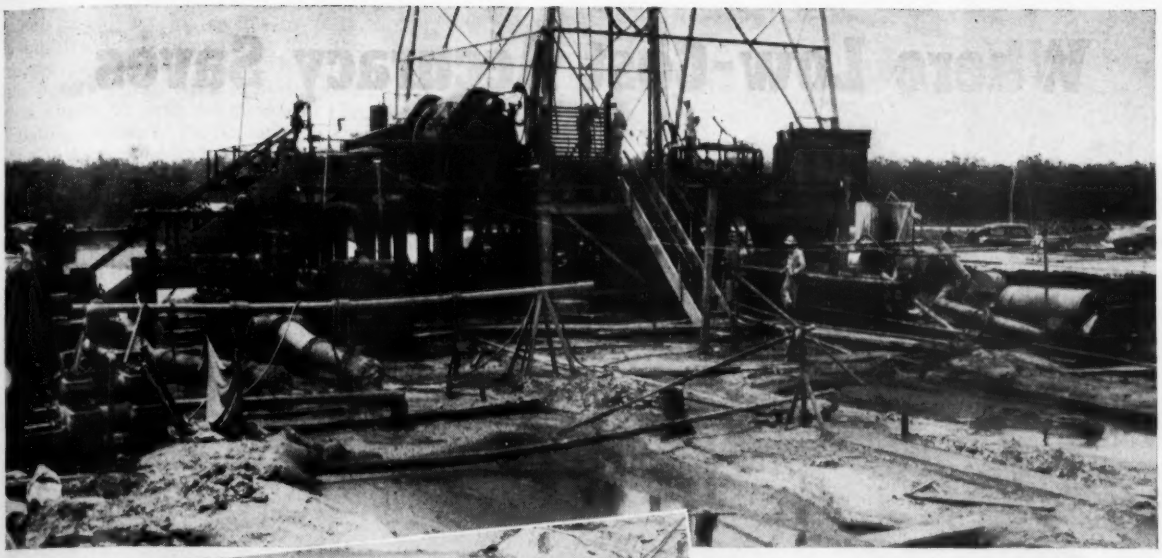

Above: Mud-conditioning system on The Texas Co.'s 6 Yturria, Willacy County, Texas, showing pumps (left), pits (center), and chemical feeders and shale shaker (right)

Left: Chemical feeders on mud-return line. V-shaped tank in left foreground is for mixing quebracho and caustic. Circular tank feeds lime. Quebracho and caustic feeder has steam line with jets running length of bottom to insure adequate mixing. In emergencies Aquagel also was mixed in this tank. Chemical tanks and shale sampler (rear) with mud-return line are permanently mounted on skid base and constitute integral unit. In left background is mud-logging laboratory which kept continuous mud log of well

by Neil Williams

Conditions Encountered in Drilling

SOUTH TEXAS' DEEPEST TEST

CONDITIONS encountered by The Texas Co. in drilling its 6 Yturria Land & Livestock Co., located approximately 12 miles north of Raymondville in Willacy County, South Texas, are indicative of what may be expected in exploration and development at ultra-great depths on the Gulf Coast. Among these conditions were excessively high gas pressures and salt-water flows, which, in the building up of sufficiently heavy mud for their control, created unusually serious problems in prevention of circulation losses and maintenance of drilling fluid. Drilling was suspended at a depth of 16,006 ft., where, with the last 1,066 ft. in 4½-in. hole, hazards were considered too great for further operation.

The test, the deepest in South Texas and the second deepest on the entire Gulf Coast, was spudded May 26, 1946. Total depth was reached April 11, 1947, in a total elapsed time of approximately 320 days. Started with an objective of only 13,500 ft., the hole and casing program was not designed for drilling to the depth eventually reached. Decision, after attaining the original objective, to continue drilling forced later reductions in hole sizes which greatly handicapped operations, increased the difficulties of controlling the high pressures and salt-water flows, and added to the hazards involved.

Drilling was done under contract by Baldridge & King of McAllen, Tex., using a steam rig employing three 150-hp., 325-psi.-working-pressure boilers with both a 20-in. triplex

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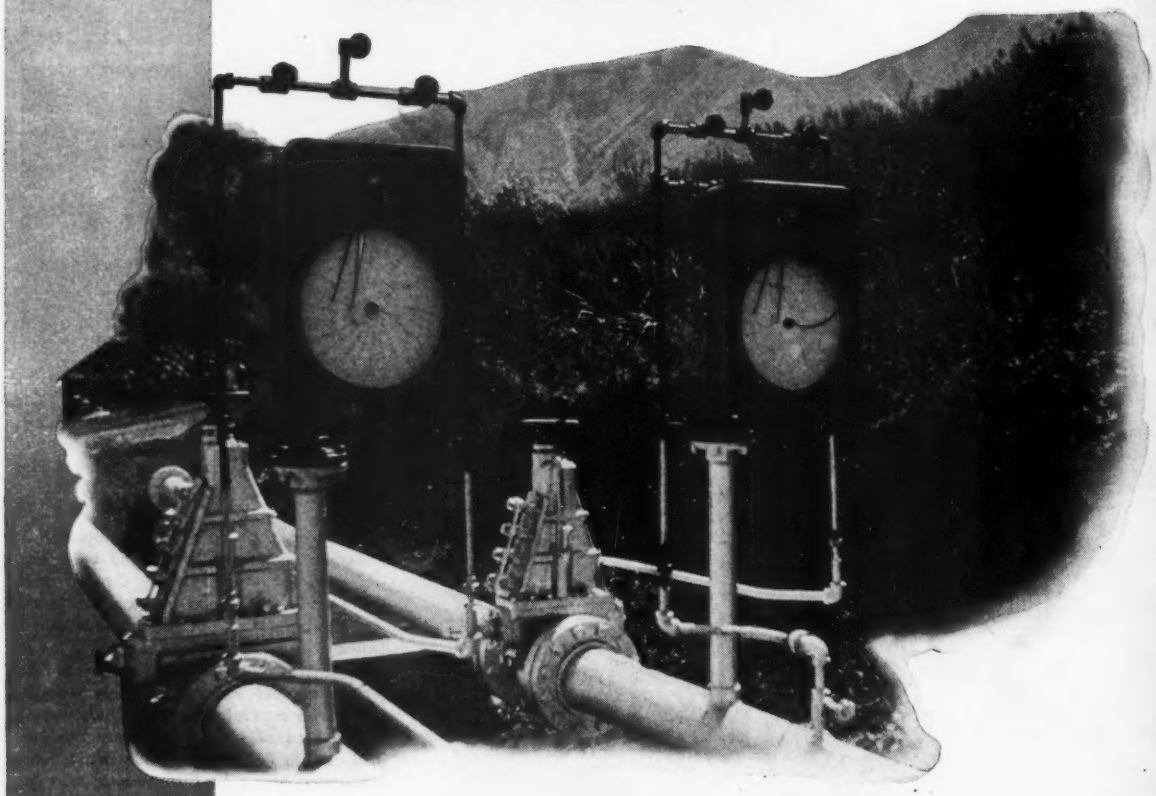

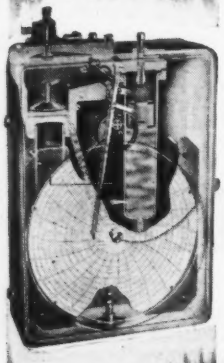

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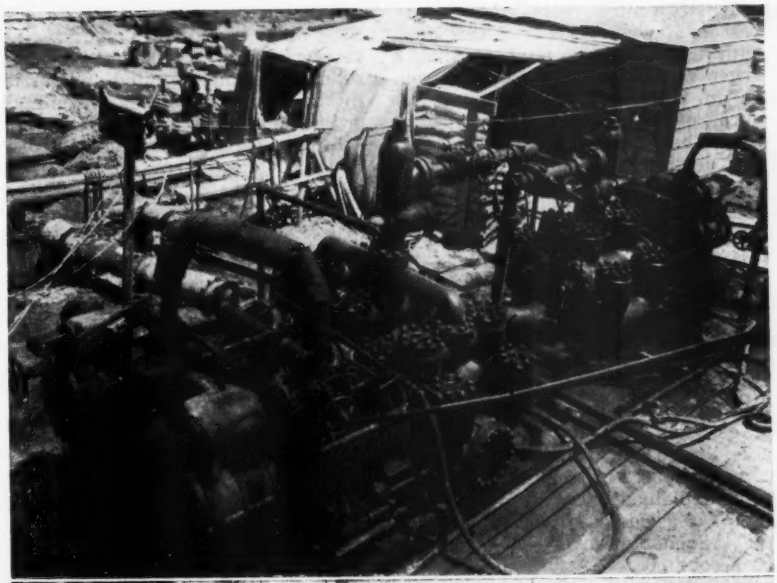
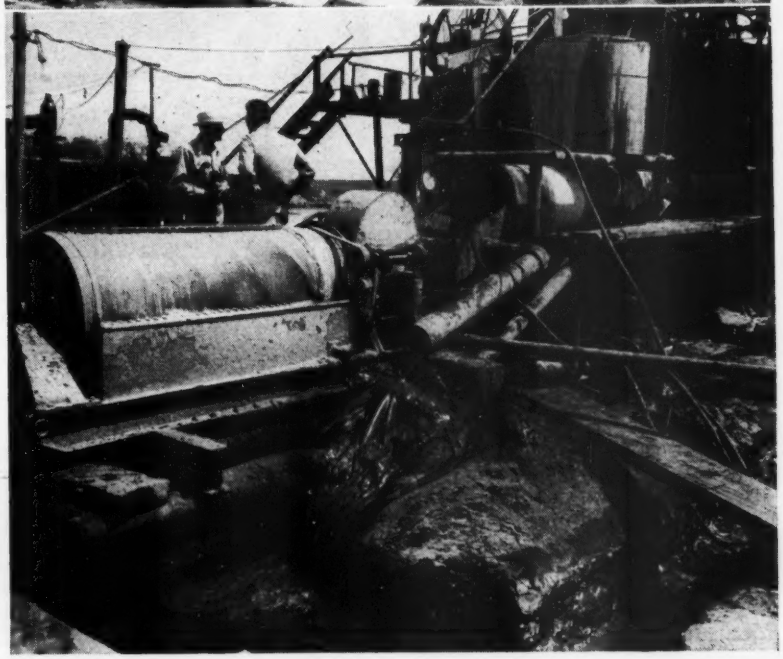
pump and a 16¼-by-7¾-by-20-in. pump for mud circulation. For the deeper drilling, the 7¾-in. liners in the duplex pump were replaced with 7-in. liners to provide increased circulating pressure. Particularly in the final 4½-in. hole, where the use of 4-in. drill collars greatly restricted the annular flow, pump pressure of from 1,400 to 1,450 psi. regularly was required. To break circulation and turn the mud over after the hole had been allowed to stand for any time, it frequently was necessary to build up pressures as high as 1,800 psi., in which instances the triplex pump usually had to be used.

Normal Drilling to 10,519 Ft.

No unusual drilling conditions nor extraordinary difficulties were encountered to the depth where the 7⅝-in. protection string of casing was cemented, which was at 10,519.81 ft. Drilling was started with 18½-in. hole, which was carried to 2,132 ft., using three fishtails for drilling and one three-way drag bit for reaming. In this hole 13⅜-in. surface casing was run to 2,124.5 ft. and cemented with 1,700 sacks of cement circulated to the top. Plug was down on June 3, or 9 days after the hole was started. After allowing cement to set, the 13⅜-in. casing was tested with 1,500-psi. pressure for 30 minutes and found satisfactory. Below this string, 10⅝-in. hole for the 7⅝-in. casing was drilled to 10,525 ft., using 16 rock bits. The latter string was cemented with 1,150 sacks of bulk cement, the job beng completed on August 16, or 82 days after the start of the well. It was tested with 2,500-psi. pressure for 30 minutes and the casing seat with 2,500-psi. pressure for 12 minutes with 10.5-lb. mud in the hole. The casing-seat pressure was equivalent to the pressure exerted by 15.5-lb. mud at 10,519 ft.

Drilling to this depth was done with a conventional gel-clay-base mud having at the end a weight of approximately 11 lb. per gallon and a viscosity within a range of 45 to 50 seconds. In anticipation of higher pressures and a need for increasing mud





Top: Circulating mud pumps, including 20-in. triplex pump (foreground) and 16¼-by-7¾-by-20-in. duplex pump. Liners in latter were replaced with 7-in. for higher circulating pressures. Back of mud house is additional mud pump reserved for mixing purposes

Center: Coming out of the hole on the next to last trip with bottom at 15,971 ft., showing breaking out of stand of 2⅞-in. drill pipe. Driller (at brake) is C. E. Snelling. Tong men are Charles Glidwell and E. J. Skow

Bottom: Bypassing gas-cut and chloride-diluted mud after trip. When circulating regularly, 7-in. bypass (center at side of 18-in. mud-return-line discharge) is raised to allow returns to discharge either through shale sampler or to pits (opposite side)

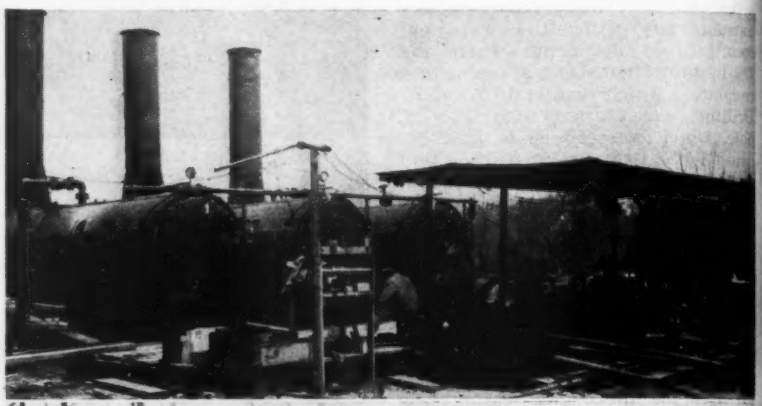
weight to control them, the gel-clay-base mud was replaced at this point with a starch-base mud so that a lower water-loss factor could be obtained more readily. With hole reduced to 6⅝ in., the 4½-in. drill pipe which had been used also was replaced with a 3½-in. string.

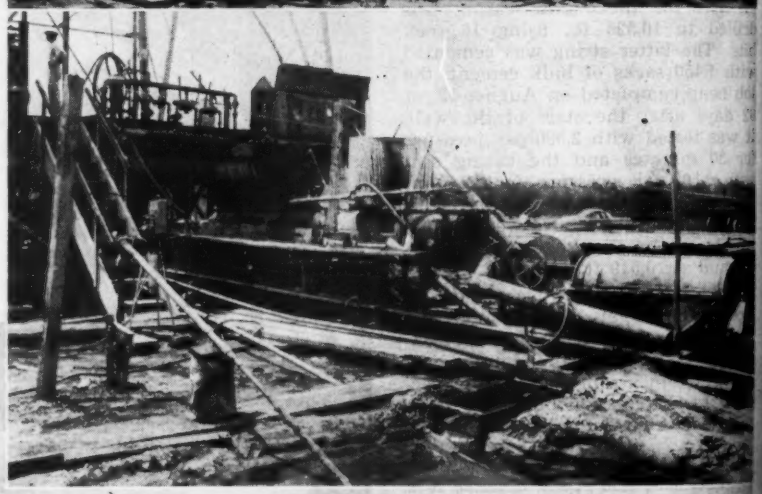
Starting mud in the 6⅝-in. hole had a weight of 10.5 lb. per gallon, a viscosity of 40 to 45 seconds, a water loss of 2.8 cc., gel strength of 6, and a pH of 12. During the remainder of the drilling the water-loss was held consistently under the above figure, at times as low as 2.1 to 2.3 cc. This and the preservation of the starch mud with high pH (12) caused very little worry at any time. Maintenance of gels and viscosity within reasonable limits, however, was an almost constant source of trouble for reasons to be explained later.

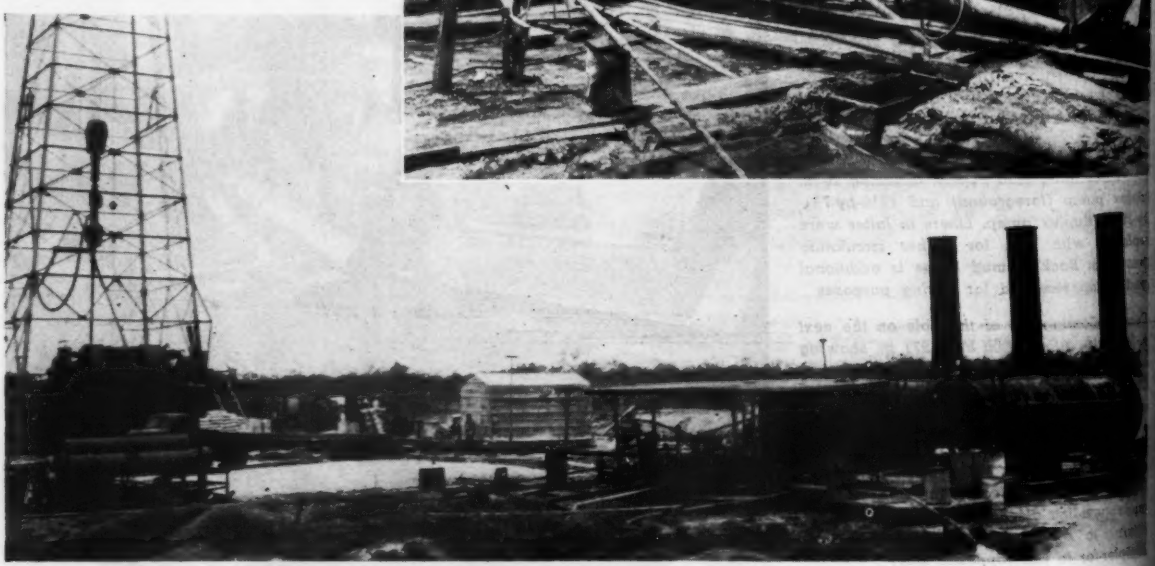
So far as viscosity was concerned, the influence of invert solids had to be accounted for. After the first loss of circulation, Jelflake was present in the mud at all times and the shale shaker had to be bypassed. Removal of solids normally caught by the shale shaker could be accomplished by settling only, and this method was not satisfactory. It was thought that these solids were finely ground and carried by the mud, contributing to the higher viscosities that were built up.

Efforts were made to hold viscosity under 60 seconds and gel within the range of 20 to 25 but at times these properties ran considerably higher than their desired limitations. Control of gel properties, as well as viscosity, was adversely affected by an unusually high chloride content in the mud occasioned by salt-water intrusions. Salinity frequently ran from 30,000 to 40,000 p.p.m.; on several occasions it was up to from 200,000 to 250,000 p.p.m., and at one time it amounted to 350,000 p.p.m. Normally, concentrations in excess of 200,000 to 250,000 p.p.m. would not be possible except in solid form, and the only explanation for the occurrence that could be made was that under the extremely high temperatures and pressures that existed in the bottom of the hole the salt was soluble, and taken into solution under these conditions it was able to retain its solubility even under atmospheric conditions at the surface.

Temperature recorded while attempting to take an electric log from a depth of 15,445 ft. was 330° F. The temperature gradient for the hole was







***Top:** Closeup of boiler installation on Texaco's deep well in Willacy County. Boilers are 125-hp. and 325-psi. working pressure, each. At right (under cover) is feed-water preheater*

***Center:** Chemical feeder tanks (on top 18-in. mud return line) and shale shaker unit. Entire assembly is permanently mounted on single skid base, with steam-mixing and water-line connections built in. Quebracho and caustic mixing and feeder tank (V-shaped) is supported in slot cut in top of 18-in. return line, and contains steam line in bottom with jets for mixing*

***Below:** Rig layout on well. Steam plant (right) contains three 150-hp., 325-psi. working-pressure boilers. Boilers are gas fired and feed water is preheated*

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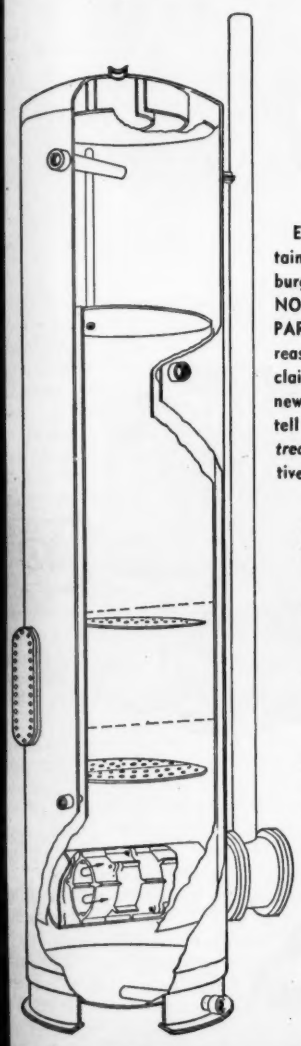

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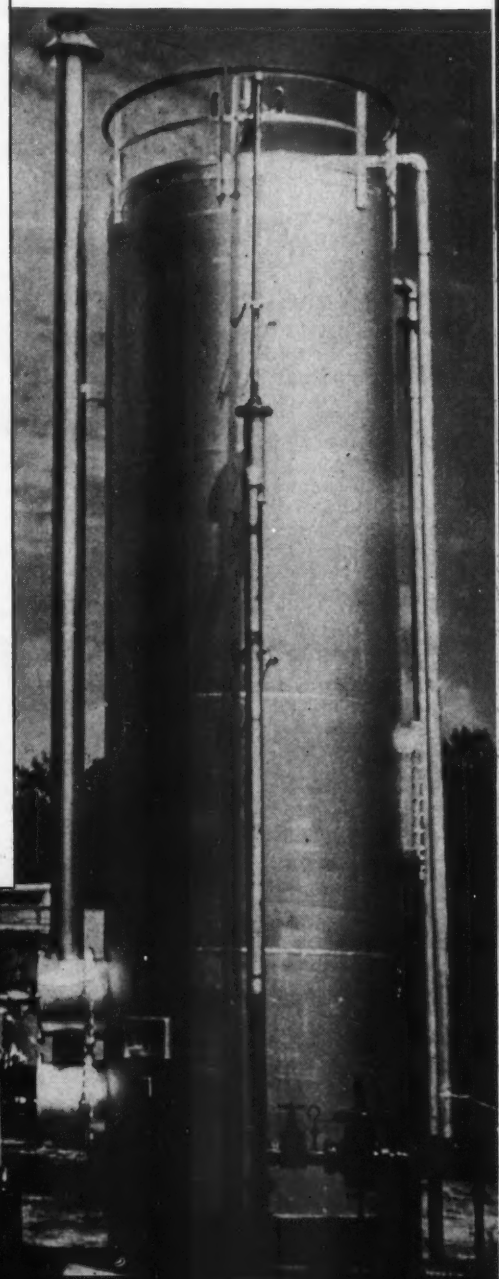

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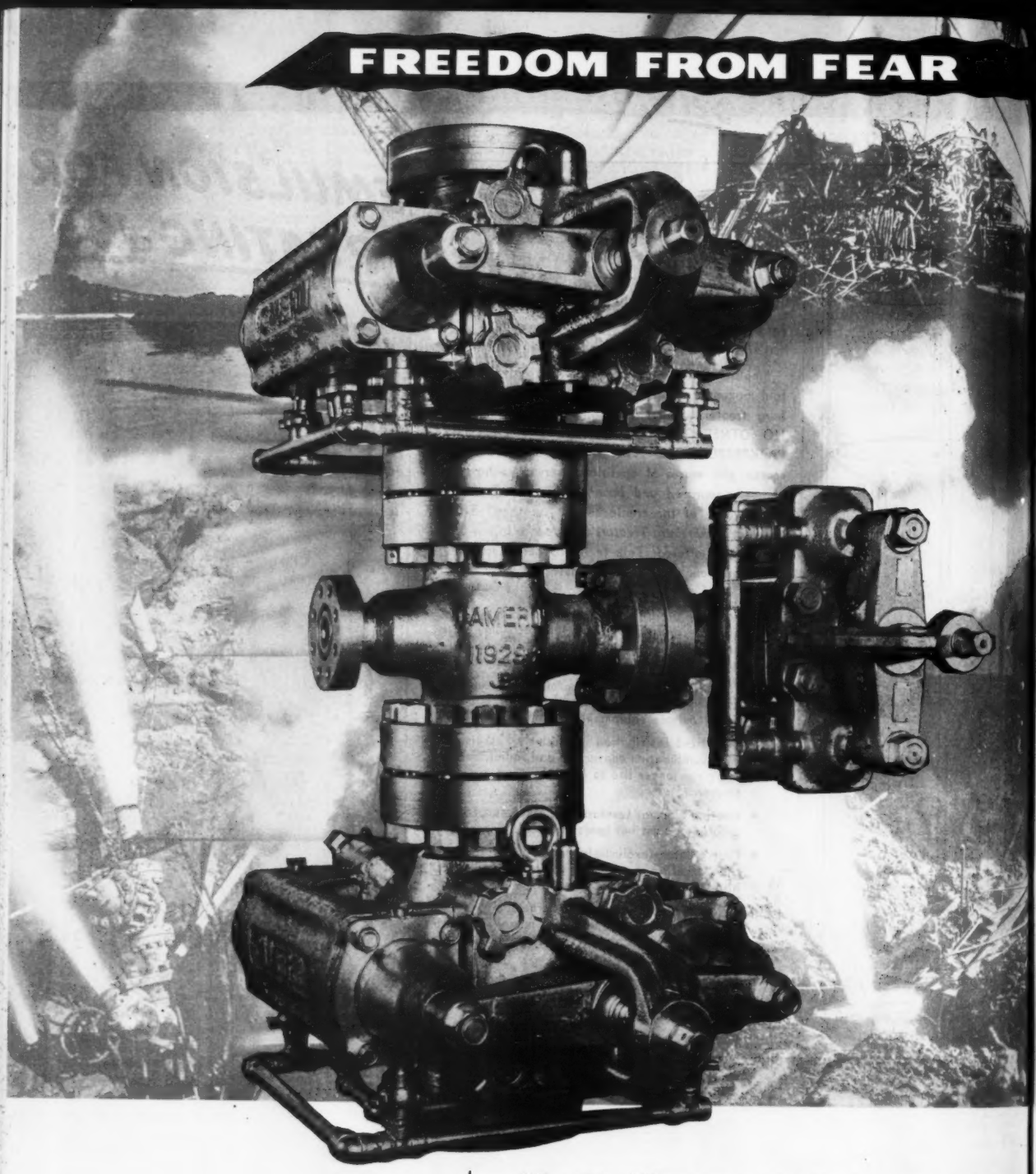

Cameron Blowout Preventers

QUICK RAM CHANGE

QRC

Cameron Flow Line Valves

HIGH CLOSING RATIO

HCR

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While most operators are familiar with the Cameron Type "QRC" Blowout Preventer design—its quick ram change, more favorable ratio of closing pressure to well pressure, low overall height and reduced weight, 10,000 lb. test models in 6", 8" and 10" sizes, etc.—the "HCR" valve was introduced more recently. It was designed as a companion to the "QRC" preventer, employing the pressure by-pass to equalize well pressures in front and behind the gate and thus obtain the same high closing ratio as with the "QRC" preventer. The ratio of opening pressure to well pressure is 4 to 1, so that the valve may be easily opened under high well pressure should it become necessary to relieve pressure thru a flow-line.

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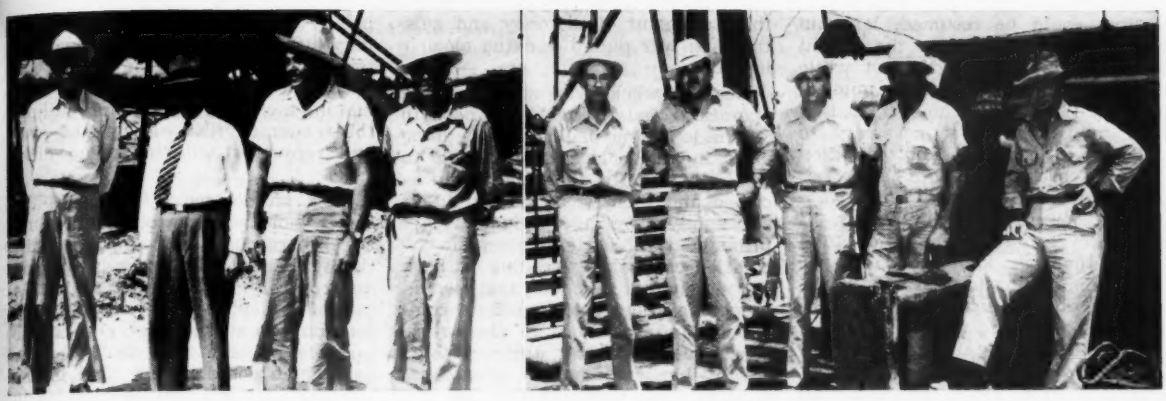

Left: H. F. Hickson, toolpusher, and Louis T. Tighe, assistant division manager, The Texas Co.; Dennis Hale, toolpusher, Baldridge & King, contractors, and J. V. A. Aldred, mud engineer, The Texas Co. Right: H. F. Hickson, toolpusher, Texas Co.; Dennis Hale, toolpusher, Baldridge & King, contractors; Don Erskine, Houston Oil Fields Material Co.; C. E. Snelling, driller, and A. M. Shook, district petroleum engineer, The Texas Co., on derrick floor of The Texas Co. deep Willacy County (Texas) test

not considered abnormal but in the depths reached, the increasing temperature became a serious factor with which to contend. Calculations based on the hydrostatic head of the mud column when mud densities of from 17.8 to 18 lb. per gallon were barely able to prevent the well from blowing out indicated bottom-hole pressures of from 14,000 to 15,000 psi.

Contamination of the mud due to gas cutting and dilution by salt water made it difficult at times to maintain sufficient hydrostatic head on the formation to hold the pressures, and large amounts of weighting material constantly had to be added. The effect of mud contamination caused mud weight to drop at times from as much as 17.5 lb. per gallon going in to as low as 9.1 lb. per gallon coming out. Drops in mud weight of from 3 to 5 lb. per gallon were common.

Occurrences of extremely high salinity and gas cutting usually came when circulating returns from bottom after trips, and were attributed to the swabbing effect created when pulling the pipe off bottom. From 80 to 90 bbl. of mud often were affected by this contamination on each trip. As returns came around, these slugs of bad mud in most instances were bypassed and discarded to prevent raising the chloride content of and contaminating the entire mud system. Because of the excessive contamination, chemical and other additions to the system could not be made fast enough to treat the bad mud and prevent pumping light streaks back in the hole. Since recirculating light streaks and cut mud created a hazard of unbalancing the mud columns between the drill pipe and annulus, it consequently was preferred to pump fresh mud after each trip before attempting to resume drilling.

Swabbing action and pulling in salt water and gas contamination was accentuated in the final 4½-in. hole, in which the use of 4-in. drill collars allowed very little hole clearance. In all cases, however, the pipe was pulled very slowly through the open hole to allow the hydrostatic head to equalize as much as possible before coming out. On trips toward the end, a stripper packoff was used on the well to close the annulus, and by holding pump pressure of from 250 to 500 psi. on the annulus while pulling through the open hole, the extent of the swabbing effect and contamination was appreciably reduced. Reverse flow through the drill pipe while coming out was prevented by a back-pressure valve which always was run in the string. This was placed about 17 stands down from the top, or a sufficient distance to permit getting out of the open hole with it still in the string.

Mud Loss Trouble

First apparent loss of circulation occurred while drilling at 12,091 ft. The 10.5-lb. mud, with which drilling had been started below the 7⅝-in. casing at 10,519 ft., had been built up gradually to approximately 15 lb. per gal., the most rapid increase being 1.2 lb. per gallon in a period of 3 days while drilling from 11,918 to 12,038 ft. Attempts to restore circulation by such methods as working the drill pipe and applying pump pressure from 0 to 1,200 psi. were unsuccessful both on bottom and after pulling up in the casing. After adding 1,500 lb. of Jell Flake to the system and dropping the mud weight to 13.9 lb. per gallon, the pipe was started out of the hole. Stops were made first at 9,000 ft. and then at 7,200 ft. to try for circulation, but each time the annulus would stand full from filling up but circulation could not be regained. Finally, at a stop at 6,700 ft. returns came around, and the pipe was started back to bottom, which was reached without further trouble with three stops being made to condition the mud system to 14 lb. per gallon. On bottom, circulation was continued for several days with 14-lb. mud to check for loss, and with none evident, drilling was resumed, and mud weight was gradually built up again.

At a depth of 12,719 ft. weight was back to approximately 15 lb. per gallon, where it was maintained to a depth of 12,801 ft. without any indicated mud loss. At the latter depth an electric log was run, and after the bit was back on bottom, returns again failed to come around, necessitating a reduction in mud weight to 14 lb. before the annulus would stand full. Circulation was not regained until after the pipe had been pulled to 5,000 ft. On the trip to bottom, stops had to be made at intervals, as before, to condition the entire system to 14 lb. per gallon.

It was indicated by this time that either new formations were taking mud or the original lost-circulation zone was becoming more easily broken down and permitting more flow. Use of 15-lb. mud was considered desirable to control pressures and prevent gas and salt-water intrusion, and generally the weight could be built up gradually to near this point without appreciable loss while drilling. However, on trips and any time the hole was allowed to stand and the mud congeal, the additional pump pressure required to break the mud and turn it over would cause the formation to break and result in loss. Consequently, on every such occasion it become necessary to lighten the mud, and on trips back in the hole to stop at intervals and condition the system throughout to the lower weight. The problem when going down with the pipe was one of trying to keep the mud light enough to hold circulation yet heavy enough to control pressures and at the same time build up the walls. Once on bottom and resuming drilling it then was necessary to build the weight slowly back again.

Getting back to bottom at 12,801 ft. with 14-lb. mud after correcting circulation losses, the weight had to be increased to 14.5 lb. per gal. before

drilling could be resumed. It again was proposed to increase the weight slowly to 15 lb. per gal., but while drilling at 12,919 ft. with the mud up only to 14.7 lb. the hole started to take mud, making it necessary to pull up to 5,000 ft. and condition the mud back down to 14.4 lb. per gal. before full returns again were obtained. With a margin of only 0.2 lb. to prevent loss of circulation, mud weight then was kept at 14.5 lb. per gal. while drilling to 13,345 ft., where another sand bearing high-pressure gas and salt water was encountered. In this, the hydrostatic head of 14.5-lb. mud was sufficient to prevent noticeable flow from the formation while drilling but after each trip the salt water and gas swabbed in by pulling pipe contaminated from 80 to 90 bbl. of mud. The effect of the contamination at the above depth reduced the weight of the mud from 14.5 to 13.2 lb. per gal. and raised the chlorides from approximately 5,500 to as high as 37,500 p.p.m. With such contamination, the practice then was started of bypassing the contaminated slugs after each trip and replacing with new mud.

Chloride Contamination

As drilling progressed through and below the 13,345-ft. gas and salt-water sand, chlorides in the mud increased, probably due to seepage, diffusion, and swabbing, and it was necessary to build up the hydrostatic head. By the time a depth of 13,379 ft. was reached, the mud weight was standing at 15.4 lb. per gal., which apparently was holding the formation content and seemed to be sealing it off, since the chloride content became steady at 22,000 p.p.m. while drilling and the degree of contamination was lessened following each bit change.

Drilling continued with this mud weight to 14,671 ft., where it was decided to run another electric log. While circulating mud returns from bottom preparatory to coming out of the hole to run the log, viscosity and gels increased excessively, making it necessary to condition mud before starting out. At the same time, gas content and chlorides again started to increase appreciably and the mud weight to fall. It was with considerable difficulty that the mud-weight decline was checked and the weight built up sufficiently to stop the flow. During this period considerable quantities of weighting materials, along with chemicals to lower the viscosity and gels, were added to the system. At times weighting material had to be added at rates up to 120 sacks an hour.

Finally, with mud weight up to 15.8 lb. per gal., the flow appeared to be under control, since no further increase in volume was noticeable at that weight, and with the mud condition considered satisfactory from the standpoint of viscosity and gels, the pipe was pulled and the electric log run.

Nearly 4 weeks were spent in these operations and trying to get back to bottom to resume drilling. While going back in the hole returns failed to come. Repeatedly, the pipe had to be pulled and then worked back down, alternately lowering the mud weight throughout the system to regain circulation, and then building it back up slowly to a point that would prevent gas and chlorides from coming in and building up the walls. Whenever mud was thinned to a weight that would restore circulation, dilution and contamination by gas and chlorides reached such a degree that additions of chemicals and other materials could not be added fast enough to condition the mud for pumping in the hole. Bypassing bad mud, new pits of mud frequently had to be prepared for replacement. This added materially to mud costs of the well. New mud usually had to be started in at a weight of around 16 lb. and laden with substantial quantities of flake and mica for formation sealing.

At one time, while mixing new mud the hole began to flow a small stream of mud. The well was shut in and a pressure of 525 psi. built up to 2 hours. From this time on the well was closed whenever circulation was down.

Unable to establish a suitable balance to prevent mud loss and at the some time hold the formation content, it was decided to attempt a brakenhead cement squeeze of the formation. Three successive attempts were made with cement mixed with bentonitic gel, but each time while attempting to drill the cement, the formations again broke down and loss of mud occurred, although some improvement in the condition was observed. On the first job 80 sacks were pumped; on the second, 250 sacks; and on the third 500 sacks. Following the last of these three squeeze jobs and while drilling soft cement plug at 10,818 ft., where returns were lost, 30 bbl. of filler plastic were mixed with 11-lb. mud and squeezed into the formation with pressures of from 200 to 600 psi. on the casing and 400 to 1,400 psi. on the drill pipe. Circulation was restored following the plastic squeeze, but in drilling cement 10 ft. below the bottom of the plastic, returns again were lost, and a second plastic squeeze was made. The effect of the squeeze jobs, while not entirely successful, was sufficient, however, to permit establishment of a satisfactory mud-weight balance and walling to get back to bottom, after several attempts, and resume drilling.

However, as the string was being pulled after the second plastic squeeze a bridge formed and stuck the pipe. Fortunately, the bit was only 70 ft. below the 7⅝-in. casing seat so that very little open hole had to be worked in. Successive spotting of oil and water failed to free the pipe, but after making a cut at 10,454 ft. and pulling, the remaining fish was washed over and recovered without undue difficulty.

Back on bottom at 14,671 ft., the 6⅝-in. hole was carried to 14,940 ft., a depth reached with continued difficulty in maintaining drilling fluid and controlling gas and chlorides. At the latter depth, because of the need for going to still heavier mud in the possible range of 17.5 to 18 lb. per gal. which could not be held in the existing open hole, it was decided to run a liner for protection. This string totaled 4,570 ft. of 5½-in. streamlined pipe, which placed the top at 10,370 ft., 149.81 ft. inside the 7⅝-in. casing. While running the liner, circulation was lost as soon as the bottom of the liner started below the 7⅝-in. casing seat. When working the liner and lightening the mud failed to restore returns, it was decided to go on down without circulation, which was done without any difficulty. The string was cemented with 250 sacks of cement, which was displaced in the liner with mud, also without ever getting any circulation. Pressure tests, however, were satisfactory and indicated that a good cement job had been obtained. The success with which the liner was run in the hole that allowed comparatively little clearance was attributed to the fact that despite the trouble that had been experienced the hole was in good condition and had been maintained within less than 1° off vertical. The liner was run on February 11, this year, or 216 days after the start of this time. Of this time 71 days were spent in the 6⅝-in. hole, for which 60 rock bits were required.

Mud Control Program

In the mud control to this depth at attempt was made to strike a happy medium between suitable and perfect mud properties while adjusting additional rates of costly mud-making materials. Such properties as funnel viscosity could have been lowered, but the weighting material necessary to keep the weight up would have been proportionately greater, so the choice frequently was to take a slightly higher viscosity. As previously mentioned, the property of low water loss and the preservation of starch mud with high pH caused little worry. Gels and viscosity were the most troublesome practices to control.

After the mud system was turned over to starch base there were three fundamental characteristics which the drilling fluid assumed. During the first phase, chemical treatment was confined practically altogether to caustic soda and quebracho addi-

tions. Very little lime was used since the mud properties remained suitable without it. Lime was present in the formations, but to such a small degree that its influence was considered negligible. It was found that control of viscosity and gels, particularly gels, were becoming increasingly difficult toward the latter part of this period with the treatment used, and additions of caustic and quebracho which previously had produced results in lowering gel and viscosity were no longer effective. At this point bench tests showed that a complete turn over with lime, using 2½ lb. per bbl. was the only method of regaining control.

After the mud had been turned over, a regular addition of lime was made each tour, and gels and viscosity were more easily controlled. At certain times during this phase of mud maintenance, the lime concentration became too high and gels and viscosity increased. However, when the lime concentration was reduced, gels and viscosity decreased also. Some of the higher viscosity readings during this period were attributed to recirculated gas. It was noticed that more lime was required as the chlorides of the mud increased.

The third phase was one during which the addition of weighting material was practically unnecessary. This period occurred while the mud was being treated with lime, and while 30 to 40 bbl. of contaminated mud were being bypassed each time the bit was changed (every five drilling tours). Approximately 100 sacks of weighting material with bentonitic gel were added to make new mud and fill up the pits after the contaminated streak was bypassed. Calculations showed that the amount of weighting material added was enough to raise the weight of the new mud only, and the mud had a new rubber-like consistency without affecting gels or viscosity.

Drilling Small Hole

For drilling the 4½-in. hole, that portion of the 3½-in. drill string below the top of the 5½-in. liner had to be replaced with 2⅞-in. pipe. As the hole drilled down, additions to the string were made with the small pipe to keep the top of this section a minimum of 150 ft. in the 7⅝-in. casing (top of 5½-in. liner 149.81 ft. in 7⅝-in. casing). With normal footage per trip, three joints (one stand) were added about every other trip.

Excessive wear of cone bearings, attributed to their small size in combination with the extremely high temperatures and mud pressures at that depth, and the consequent danger of cones breaking off in the hole, presented an added hazard in the use of 4½-in. bits. Because of this wear, a practice was inaugurated at the start of changing bits every 24-hour run or every 40 ft., whichever came first, regardless of the condition of the cones. When, while drilling at 15,550 ft., 610 ft. below top of the open hole, cones were lost off one bit run only 22 hours, the run time was reduced further to 20 hours for the remainder of the hole. Although this added to the number of trips, since many of the bits were pulled with cones showing only negligible wear, it may have prevented several costly cone-fishing jobs that might have resulted from premature breaking of bearings. Since fishing in such a small hole at that depth and under extremely high-pressure conditions presented many possible problems, it was important to exercise every precaution to avoid such an occurrence.

On the one time, at 15,550 ft., when cones were lost, more than 2 weeks were required to clean the hole. During that period, 18 trips had to be made while running various types of cone and junk baskets, bailers, milling bits, or reamers. On one of the trips with a rock bit and basket, three additional cones were dropped, this further complicating the job of recovery. After the hole was cleaned, considerable trouble was experienced in getting the mud back in shape to resume drilling. Because of being out of the hole so long and unable to circulate, the mud had become badly contaminated with gas dilution and chlorides and weight had dropped from 17½ lb. per gallon at the start of fishing to 9.1 lb. per gallon at the end.

It was interesting to note that in the recovery of the cones, pieces of tong dies, and links from the spinning chain also were recovered. Consequently, after that, to prevent any further possibility of small pieces of metal falling in the hole, a pipe wiper was kept on the pipe both while coming out of and going in the hole.

Because of the danger of breaking off cones, and the use of the small pipe, it was necessary to limit weight on the bit to around 2,000 lb. and hold rotating speeds under 45 to 50 r.p.m. Three to four 4-in. drill collars were run to permit application of the most weight possible at the bit while holding the pipe in tension, and thus avoid any tendency of the pipe to whip. With the restricted mud flow at the bottom, resulting from use of 4-in. collars in small hole, circulating pressures regularly were from 1,400 to 1,450 psi. while drilling, and to break the mud and turn it over after standing it often was necessary to build up pressure to around 1,800 psi.

High gas pressures and salt-water flows dictated use of mud weights within the range of 17.5 to 18 lb. per gallon. Although loss of circulation was not a factor as it had been in the 6⅝-in. hole, increased difficulty was experienced in maintaining the weight and other suitable mud properties due to gas and chlorides in the mud. On various occasions the well kicked heavily and it was necessary to close the preventers to keep the well under control. After mud had been conditioned, comparatively little trouble would be experienced while drilling, but after trips, as before, the mud would contain excessive gas and chlorides swabbed in while pulling pipe. On some trips when going back in the open hole it was necessary to run one joint of pipe at a time, make connections each successive joint and circulate to separate the slugs of bad mud. Plenty of new conditioned mud had to be kept on hand in pits at all times to replace bypassed mud to insure the desired weight and properties when going in.

Running Electric Logs

Electric logs were run from a depth of 15,445 ft., and later from the total depth (16,006 ft.). In view of the high salinity (about 60,000 to 70,000 p.p.m.), it was considered questionable whether any readings could be obtained with the existing mud in the system, since experience in running previous logs when the salinity was only 35,000 to 40,000 p.p.m. was that poor readings resulted. Consequently, for each of these lower logs, a batch of 100 bbl. of new mud, using fresh water for mixing, was prepared in advance in the pits. With this, pipe in the hole was pumped out joint by joint from the bottom into the 5½-in. liner, replacing the old mud gradually as the pipe was pulled. By this method, it was possible to keep chloride content low and thus permit better logs. In addition to the electric logs, a continuous mud log was made from a depth of 5,075 ft.

Approximately 49 days were spent in the 4½-in. hole with 20 rock bits being used. Because of the procedure of pulling pipe slowly to minimize swabbing in gas and chloride contamination round-trip time averaged from 11 to 12 hours. Made up in thribles, the string contained a total of 177 stands at the total depth. Below the 7⅝-in. casing, approximately 67,000 sacks of weighting material, along with about 8,000 sacks of starch, were used, and total mud costs ran around $175,000.

A string of 4-in. liner has been set on bottom with top sealed off in the bottom of the 5½-in. liner, and as this is written preparations are being made to perforate and test the various gas sands encountered.

Among those directly associated with the supervision of drilling the well for The Texas Co. were Louis T. Tighe, recently promoted from South Texas division, drilling superintendent to assistant division manager; H. F. Hickson, tool pusher; A. M. Shook, district engineer, Freer, Tex., and J. V. A. Aldred, mud engineer. For Baldridge & King, the contractors, Dennis Hale was tool pusher.

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EXPLOSIVES

Find many uses in oil production

by M. M. Kinley* and Jack Kinley*

EXPLOSIVES are usually thought of only as a destructive force. When properly handled, and controlled, explosives have many uses in the oil industry.

For example, in the last few years, new methods of producing oil have been perfected in which explosives are essential. Among these are the gun perforator, the side-wall core, and the seismograph.

There are also old uses of explosives in the oil fields. Shooting oil sands for production is an old story (except on the Gulf Coast, where the loose, unconsolidated sands make this unnecessary). Casing shooting, to recover the uncemented upper portion, is a familiar salvage operation all over the country. No special mention is made of either of these in this article since they are so generally well known.

There are many other ways in which explosives can be used to great advantage. This article deals with a few of these, such as opening old screens in order to set new screens inside, opening clogged casing perforations, loosening screens (or perforated pipe) in order to pull them, loosening packers, loosening tubing or drill pipe in order to back it off, and perforating tubing.

*M. M. Kinley Co., Houston.

Opening Screens

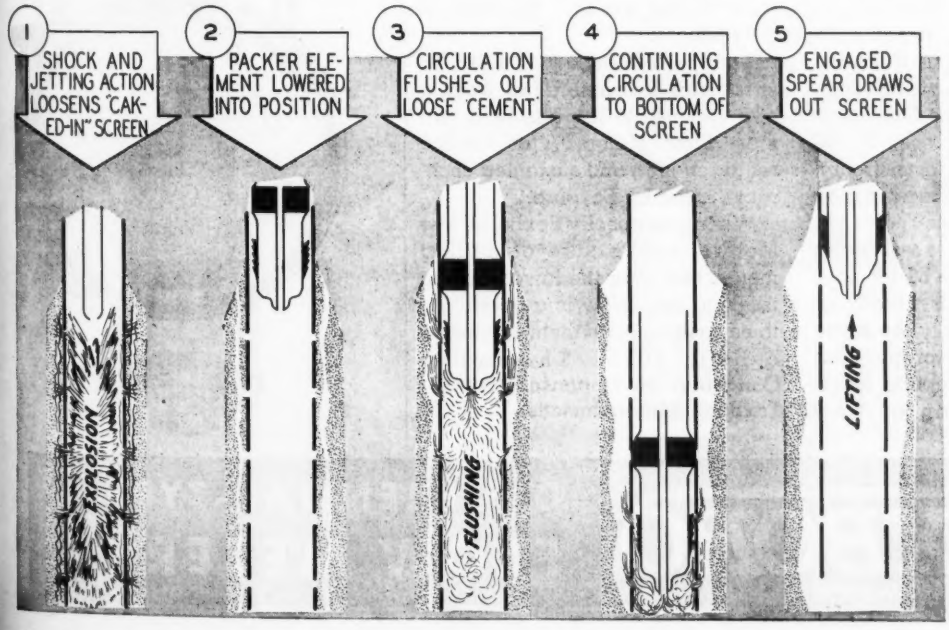
On the Gulf Coast, where screens are used in producing wells, it often happens that, when the bottom-hole pressure drops, a slight clogging of the screen will stop the flow of oil. Since most of these wells are small producers, an expensive workover job is prohibitive.

However, a small charge of explosive can be run into these wells to clean the screen. This can be done at a very small cost, compared to that of a workover job.

When the shot has been fired, the explosion generates a tremendous fluid "hammer," and immediately drives the fluid outward through the screen openings. The shock wave of the explosion, combined with the terrific jet of fluid through each opening, scours the screen free of the sediment and corrosion products which have clogged it.

Gulf Coast oil wells are often plagued by another difficulty. Once it gets started, through a small hole in the screen, sand has a terrific cutting action, and it will rapidly enlarge that hole until the bottom of the well is filled with sand. For a long time the only solution to this problem was to pull the screens and replace them, a long and expensive operation. Setting a smaller screen inside the one already in place has usually been ruled out because the jetting action of the hole in the old screen would soon cut a hole through the new screen.

It is possible to solve this problem, as follows: A charge of explosives, considerably larger than that used for merely cleaning screens, is placed in the entire length of the screen. When this explodes, it ruptures the screen wrappings, or enlarges the screen openings, for the full length,



Procedure followed to free and remove stuck or cemented screen or liner by use of explosives. The packer element lowered in the hole (2) after shooting and breaking up the cementing material (1) includes a spear assembly on bottom which engages to top of the liner of screen (5) for pulling after the loosened deposit is circulated and flushed from the hole (3) and (4)

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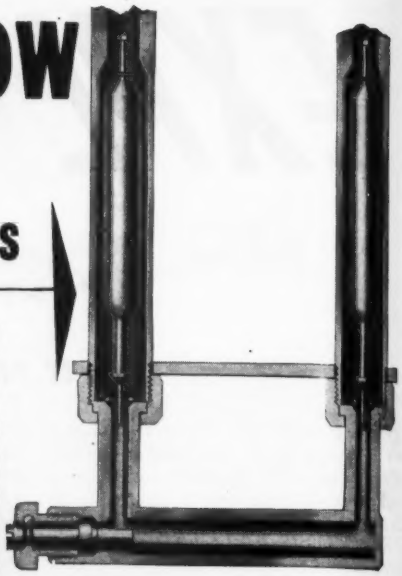

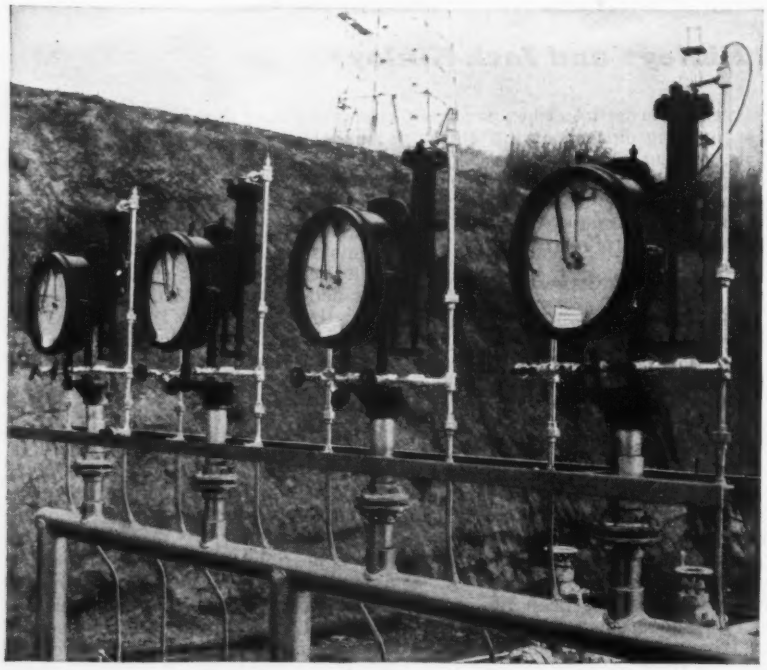

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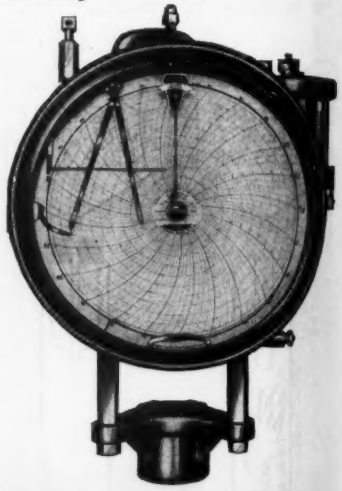

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so that when the new screen is placed inside it will be exposed to the full depth of the sand, and there will be no concentrated cutting action.

In time, some casing perforations will stop up on the outside. This will diminish, or completely shut off, the flow of fluid or gas into the casing. When this condition arises it becomes necessary to open the perforation by the use of pump pressure or gas pressure. This pressure must be greater than the bottom-hole pressure of the producing well, and enough greater that the fluid in the hole will be forced out through the perforations in the casing, thereby pushing back the bridge which had formed in the perforation. If this method will not open the perforations, ordinarily the next step is to kill the well, pull the tubing, and reperforate.

Here, again, an expensive workover job can be avoided by the use of explosives. If the tubing is not bull plugged, and the well can be killed, so that it will not flow, a light charge of explosives can be run in on a wire line to a point below the bottom of the tubing, opposite the casing perforations, and exploded.

Here, just as in shooting the screens, the explosion generates a tremendous fluid hammer, and immediately forces the fluid outward through the perforations. The shock wave of the explosion will break up any obstacles that are lodged in the perforations, and the terrific jet of fluid through each perforation will scour it clean. From then on, the fluid will enter the hole freely.

It has not been necessary to kill the well, to pull the tubing, nor to reperforate. A great deal of expense has been saved, and the down time is small, or negligible.

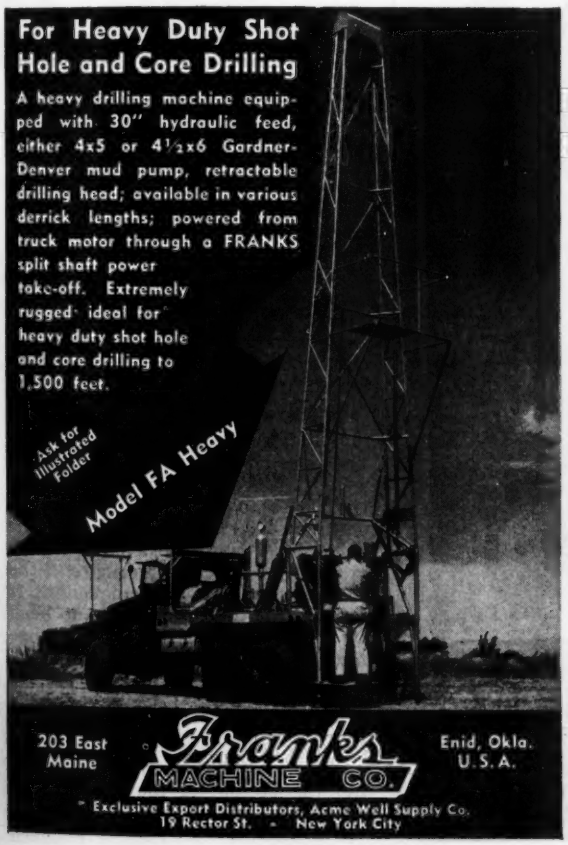
Loosening Screens or Perforated Pipe

When it becomes necessary to pull a screen or perforated pipe, explosives and explosive shots have been used to great advantage. Before, the method used was to go in and cut the screen into sections varying from 20 ft. to as little as 1 ft. at a time, depending on the length that can be pulled. Cutting and pulling can be a very expensive workover job.

The reason that screens are hard to pull is that the calcium or other chemicals in the fluid will form a cement. This, with the sand packed around the screen, has it so firmly held that it cannot be pulled. By using a light explosive shot, the deposit on the outside is cracked and loosened. This method of shooting the screen has been found very successful. (This method, used in open hole, is somewhat different from that used inside casing, which will be discussed later).

Screens are loosened in the open hole as follows: First, place the shot to open perforations in the screen (or slotted pipe), and explode it. This will open the screen, crack and break up the "cement," and loosen the sand, outside the screen. Second, run the spear and packoff element into the hole on the drill pipe. Third, upon entering the top of the liner with the packoff element, start circulation. This will wash the top layer of the sand from behind the screen. Fourth, lower the packoff element, in stages, until the bottom of the liner is reached. It is necessary to stop circulation while the packer is being lowered, so that the packer will not be damaged by having pieces forced out the perforations as it goes by. This operation will wash out the successive layers of sand until the screen (or perforated liner) is completely free. Fifth, fasten the spear to the top of the screen or liner and pull on it. The shot has opened the screen and loosened the sand, and circulation has removed the sand from behind the screen, thereby loosening the screen and making it much easier to pull.

Here the use of explosives, while it has not eliminated the necessity for a workover rig, has cut the rig time enough to pay for itself many times over, by saving a great many trips into the hole, cutting and pull-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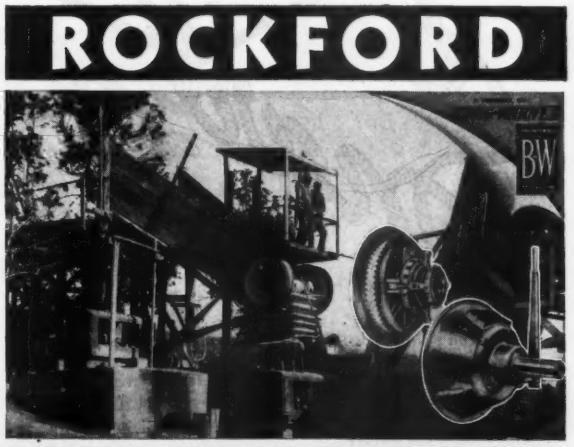
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ing for each piece of screen recovered, no matter how small.

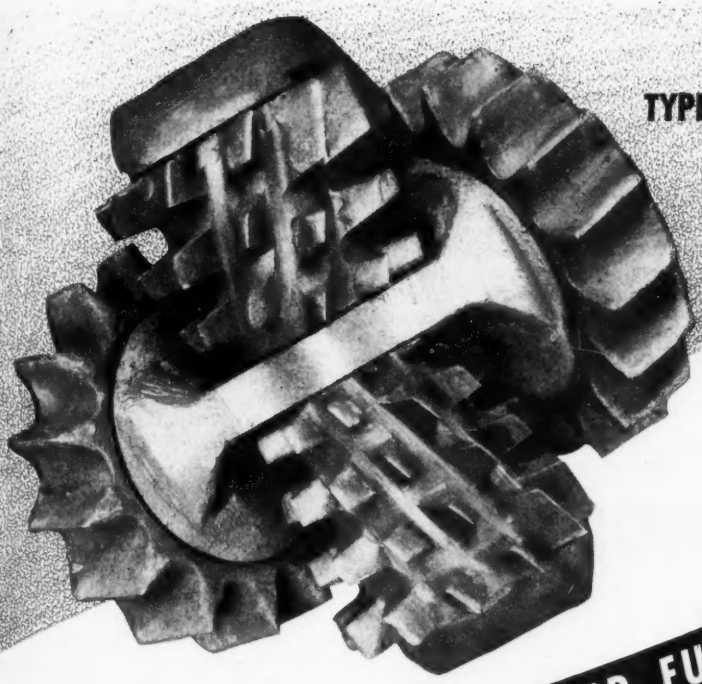
By the use of a cordite explosive, a packer that is stuck may be loosened so that it can easily be pulled from the hole. For example, in a well that was being worked over, it was found that the packer was stuck. The operators planned to test an upper sand, and when this was learned they decided to leave the packer in the hole by shooting the tubing in two. A shot was run into the tubing within a few feet of the packer and a strain was put on the tubing and the shot exploded. Instead of shooting the tubing in two, the shot freed the packer, which was then withdrawn. This example shows that a packer can be loosened with explosives.

Loosening Tubing

When it becomes necessary to unscrew a string of tubing which has a left-hand nipple close to bottom, and the tubing fails to release at this point, a torque may be applied to the right, and a small charge of explosive placed just below the left-hand threaded nipple. This, when exploded, will momentarily loosen the joint so that the torque will unscrew it. The jar from the shot acts on the joint in the same way as would a blow from a heavy hammer. This method has been used successfully in loosening drill pipe at a tool joint, the subject of the next section.

Shooting stuck drill pipe in two has been common practice on the Gulf Coast for a number of years. A time bomb, drop weight, or electric line may be used to explode the shot. Shooting drill pipe does have one disadvantage compared with cutting tools, namely, that the upper end of the piece left in the hole may be so ragged that it will cause a difficult fishing job. However, it has a big advantage in the fact that it can be done on a wire line. This means that it is quick, as no time is consumed running pipe in the hole and out again, and making one or more long-drawn-out cuts.

Of the three methods of exploding the shot, the electric line is the best. The disadvantage of using a drop weight is that the mud may be so viscous (especially near the bottom) that the drop weight cannot hit the firing head with sufficient force to explode the shot. Furthermore, if the hole is the least bit crooked, it is possible for the drop weight to hang up along the walls of the drill pipe and never reach the top of the shot. This leaves a very dangerous situation. If it should become necessary to pull the shot from the bottom of the hole, the weight may be freed and drop, or the shot may be pulled into the bottom of the weight with sufficient force to set it off. This would part the drill pipe up the hole,



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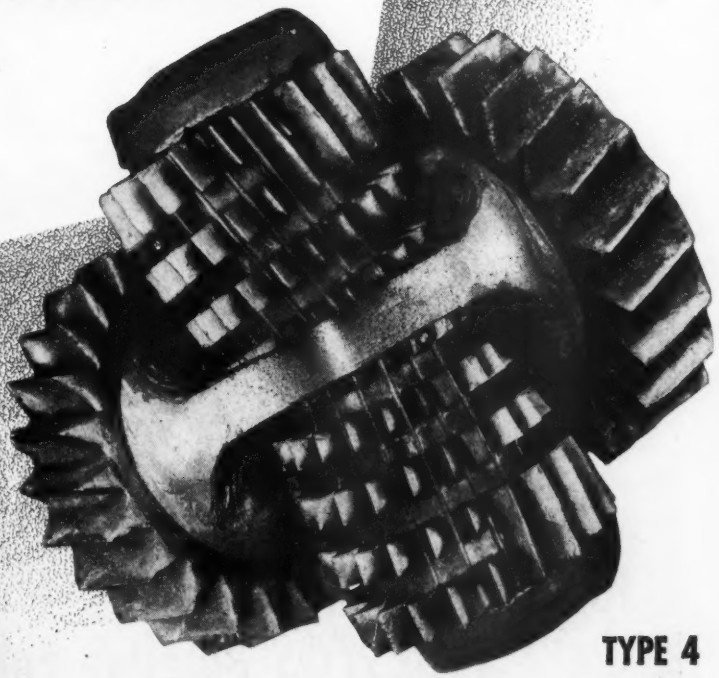

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and further complicate an already bad situation.

Time bombs also have a disadvantage. Usually everything runs with clock-like smoothness. But with the extreme conditions of pressure and temperature encountered on the Gulf Coast, there is always the possibility of trouble. And, if a time bomb is set, and run into a hole, and then does not explode at the proper time, it should never, under any circumstances be withdrawn from the bottom of the hole. This would be very dangerous to both life and property.

The method of using a steel-wrapped electric cable for shooting drill pipe is the best possible means of successfully locating the shot at bottom, and exploding it without hazard. This line, with its steel wrapping, has sufficient weight to push the shot down through heavy mud. If it becomes necessary to withdraw this shot from the bottom of the hole, the chances of it going off and causing any damage are very slight.

The new method of loosening drill pipe is essentially the same as that already described for loosening tubing. A light charge of a cordite explosive is lowered to the joint it is desired to unscrew. This charge can be heavier that that used in tubing without endangering the pipe. With drill pipe, of course, there will be no left-hand-threaded joint, and the location of the shot is depended on to select the point to be unscrewed. As soon as the shot is in place, a torque back to the left is put on the top of the drill stem and the shot is exploded. Again the jar from the shot loosens the joint just as a heavy hammer blow would.

Tubing Perforating—Gas Lift

A relatively new development on the Gulf Coast is becoming quite popular. This is the use of a small charge of explosives to furnish the power for perforating tubing, either leaving a ¼-in. hole, or leaving an orifice bushing with a hole through it. Orifice diameters from 3/64 to 8/64 in. are available.

This is a quick and easy way to install a gas lift. The tubing perforator itself is a small tool (1¾ o.d. for 2-in. tubing), heavy enough to go down in heavy mud, yet light enough to hang on a measuring line. The principal advantage of this method of installing a gas lift is that it is not necessary to pull the tubing, and therefore no workover rig is required. Because the perforator is run through a stuffing box, using a lubricator, it is not even necessary to kill the well, though it must be shut in during the operation. Another advantage is that there is no obstruction left in the tubing to prevent swabbing, paraffin cutting, taking bottom-hole pressures, or any similar operation.

The explosive tubing perforator has an advantage over other methods in that the action is positive. The work is all done in one operation, and it is immediately evident at the top of the hole that the orifice is in place. The residual power of the shot which made the perforation is used to operate a tripping device which releases the perforating tool from the collar in which it had been set. By a special method of locating the gun in the collar it is possible to know exactly where the orifice is located in the hole, which will be an advantage when setting other tools in the well.

By perforating his tubing in this manner, the operator has saved, or at least put off, with consequent saving during that time, the costly installation of gas-lift equipment.

The loosening of screen, or liner, in open hole has already been discussed. When a string of tubing is sanded up between the tubing and the casing, a series of perforations can be placed in the tubing to circulate the sand out, thereby eliminating an expensive cutting and fishing job.

If the tubing is sanded up inside, it will be necessary to bail or wash it out to the bottom of the tubing. It may be necessary to plug the bottom of the tubing so that fluid will not be pumped out the bottom and into the lower formations.

The top of the sand outside the tubing may be located as follows: Run a tool to the bottom of the tubing

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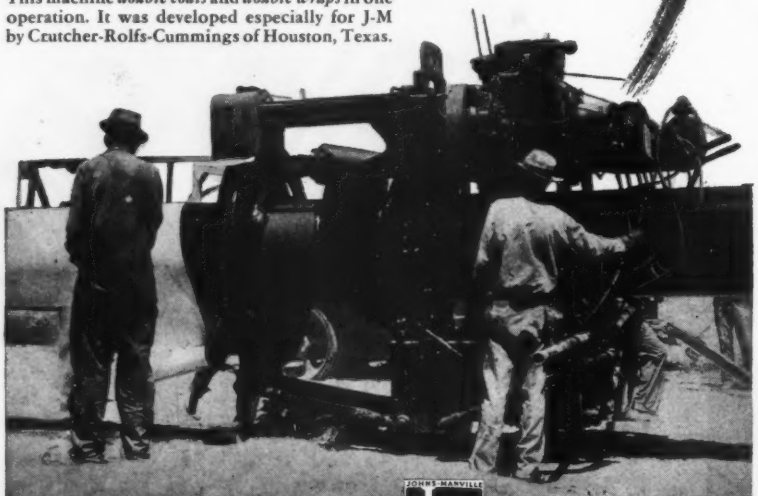

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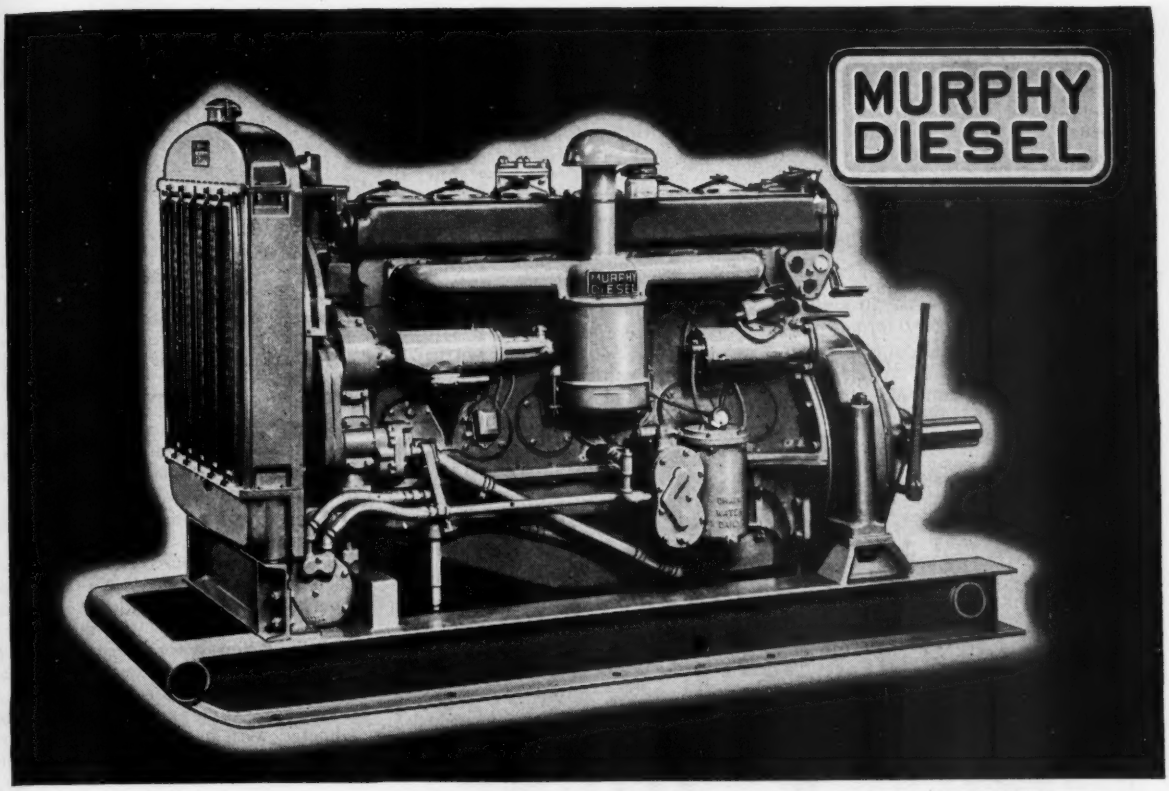

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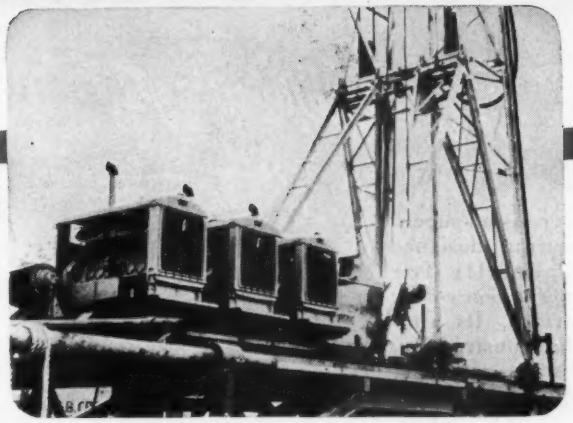

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and withdraw it. At each collar, set up sound vibrations inside the tubing. So long as these sound vibrations cannot be picked up at the top of the hole, they are being damped out by the sand around the tubing. As soon as these sound vibrations can be picked up at the top, the tool is in a collar which is out of the sand, and the top of the sand has been located.

The tubing perforator is then run into the hole on a wire line, and a ¼-in. perforation is made in every joint, or every two joints, throughout the depth of the sanded area.

After the tubing has been perforated, the well is ready to circulate. The upper perforation will start circulating first. After the sand is washed out from between the tubing and the casing above this point, a canvas plug is pumped down the tubing, and it is forced into the hole that is circulating, stopping it up. The next lower perforation will then start circulating, washing out the sand between strings the same as the first. This process is repeated until all the sand has been washed out of the casing, to bottom, freeing the tubing.

If the sand behind the perforation is packed so tightly that it will not wash out, a light cordite shot can be run in and exploded to jar the tubing and loosen the sand behind it.

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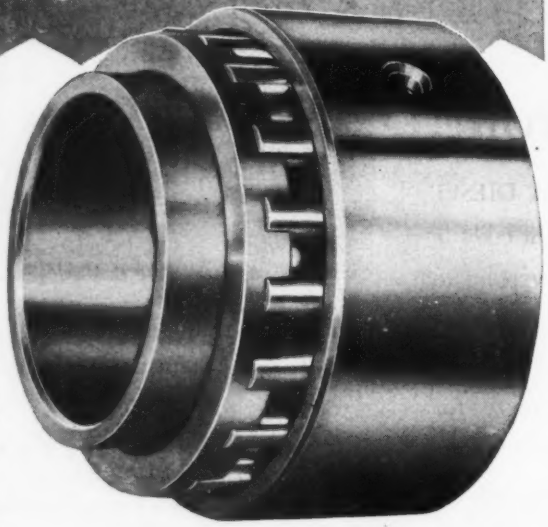

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Tubing Perforating—Circulation

The explosive tubing perforator can be used to establish circulation. With the explosive perforator it is possible to perforate above the packer to recondition the mud before pulling the packer loose. The reason for this is that, if the mud is heavy and viscous inside the tubing, so that there is no jar action, the tools and perforator are picked up about the length of a joint of tubing and dropped, stopping the perforator in a collar. This brings the jars together, which shears a safety pin and fires the shot, thereby perforating the tubing.

Summary

This article is a necessarily brief description of a few of the more important applications of explosives in the oil industry on the Gulf Coast.

There are fundamentals in any use of explosives in a deep well:

First, most explosives must be protected from pressure. No explosive operates as well under an initial pressure, and many will not operate at all. When a pressure-tight shell is used, it must be designed so that it will not collapse.

Second, the explosives must be selected with a view to the temperatures likely to be encountered. Different explosives have different temperatures at which they will detonate spontaneously. More than this, they become more and more sensitive to shock as their detonation temperatures are approached. Even at ordinary temperatures explosives are quite different in their sensitiveness.

Third, most explosives must be protected from moisture, though some are relatively insensitive to this. When a pressure-tight container is used, this factor is automatically taken care of.

Fourth, when the explosion must be confined in a gun, as in the perforator, the latter must be so designed that it will not burst. This is a matter of special alloys and special heat treatment for the gun. It also limits the type of explosives which can be used.

Fifth, when the shot is intended to disrupt the container, the latter must be so designed that the debris from it, left after the shot has gone off, will not interfere with subsequent operations in the well. This again is a matter of special materials and special treatments.

Sixth, when drilling muds are heavy or viscous or both, attention must be given to the problem of getting the shot down. The shot itself must weigh enough to drop through whatever mud is encountered.

Seventh, special consideration must be given to unusual conditions of the well being shot. For instance, a small restriction in a tool joint, or a small hole in a spear or packer through which the shot must go, limits the outside diameter of the shot.

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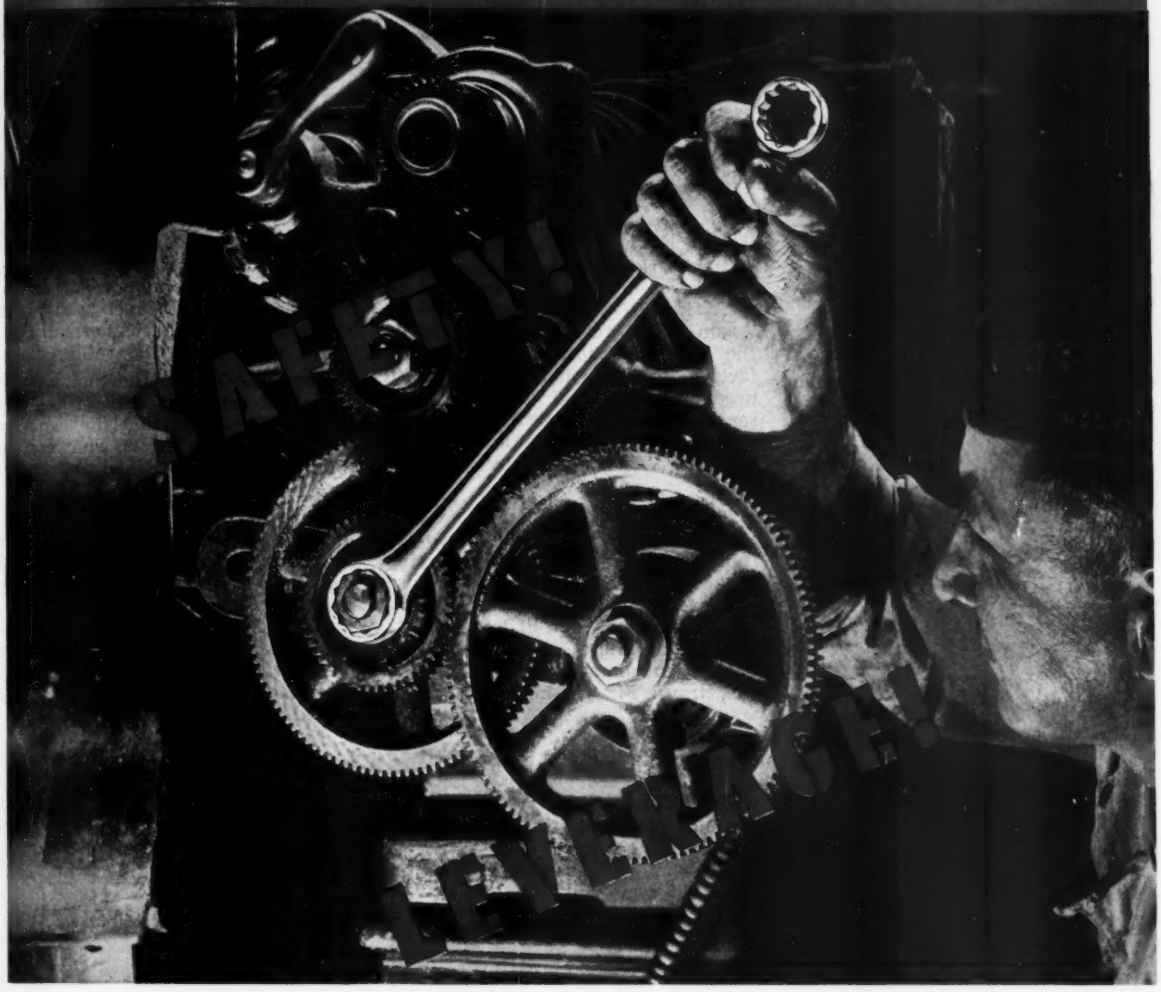

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Increasing Tower Capacity By Sacrificing Fractionation

In a small plant that I was visiting, I was told that the kerosene plate of the topping plant was being refluxed with gas oil. Could such an operation be satisfactory? I checked carefully and have no reason to think that I am misinformed.—F.R.W.

A tower operation similar to the one you mention has already come to the attention of this department and a diagram of a topping tower operating in such a manner is shown in Fig. 1. Although extremely large capactities can be handled through such a tower, the fractionation attained is very poor. In fact, the tower functions more as a mechanical scrubber than as a fractionator. It simply scrubs out any entrainment that may tend to be thrown from tray to tray. If the market specifications of gasoline, kerosene, distillate and gas oil were not so easy to attain, there would be no reason for considering the operation shown in Fig. 1. The fact is, the fractionation required to produce marketable gasoline, kerosene, etc., is so simple that the system shown here can be and is being used (at least in part) by some refiners.

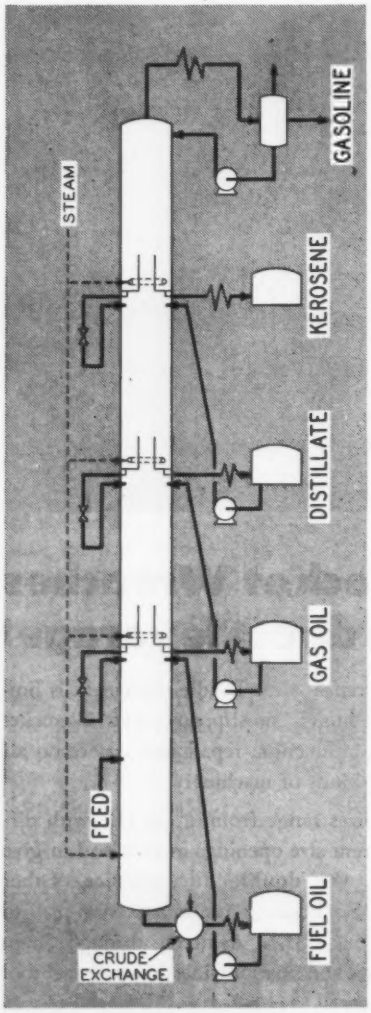

Fig. 1—Increasing the capacity of a fractionating tower by about 80 per cent by using it as a partial condenser

The common practice of removing all reflux heat by means of top reflux puts a large vapor load on the top of the tower and requires the use of a relatively large tower. Meanwhile, the vapor load at lower points is low and there is little tendency toward entrainment at the gas oil, etc., trays. Fig. 2 shows the vapor volume that must be handled at various points in a typical topping tower when different methods of removing reflux heat are used. The various means of removing reflux heat shown in Fig. 2 are:

Curve A. — Cold reflux is used below each side-draw plate as indicated in Fig. 1. Each side product is cooled and pumped as reflux to the tray situated just below the next higher side product. Thus, distillate is used as reflux just below the kerosene draw plate. Scarcely any fractionation occurs and theoretically no vapor except that of the products passes upward through the tower. Of course, some fractionation occurs by partial condensation as the vapors are cooled.

Curve B. — Each side-draw product is cooled and circulated back to the draw tray or one or two trays higher in the tower. This is scarcely better than Operation 1 except at the lowest side-draw products,—but it also greatly increases the capacity of the tower.

Curve C.—Each side product is cooled and circulated back to the plate just below the plate from which it was drawn. Thus, it is superficially the same as Operation B except that reflux is returned to a plate below the draw plate rather than on the draw plate itself. It is also equivalent to putting a cooler in the tower below each draw plate. Considerably better fractionation is obtained, probably enough to produce satisfactory products at all points except at the top. The capacity is increased about 50 per cent over what is normally obtained when using top reflux alone.

Curve D.—This is the common operation of refluxing only at the top of the tower. Note that the capacity is 50 per cent or less of what can be obtained by other methods of removing reflux heat.

Curve E.—This intermediate method of refluxing involves the use of top reflux and the circulation of cold gas oil to the plate below the distillate plate. The capacity is large, it provides reasonable fractionation for the gasoline, kerosene, and gas oil, but the distillate will not be well fractionated. *(Continued on page 95)*

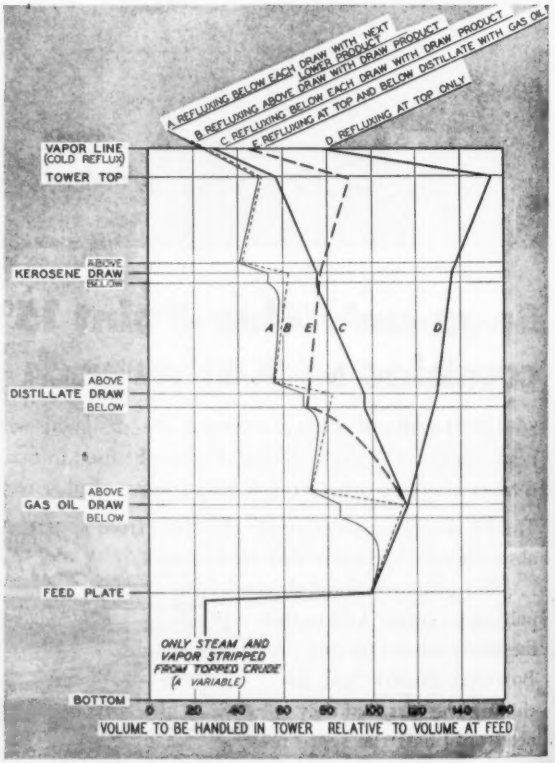
A. REFLUXING BELOW EACH DRAW WITH NEXT LOWER PRODUCT
B. REFLUXING ABOVE DRAW WITH DRAW PRODUCT
C. REFLUXING BELOW EACH DRAW WITH DRAW PRODUCT
E. REFLUXING AT TOP AND BELOW DISTILLATE WITH GAS OIL
D. REFLUXING AT TOP ONLY
VAPOR LINE (COLD REFLUX)
TOWER TOP
KEROSENE DRAW
ABOVE
BELOW
DISTILLATE DRAW
GAS OIL DRAW
FEED PLATE
ONLY STEAM AND VAPOR STRIPPED FROM TOPPED CRUDE (A VARIABLE)
BOTTOM
0 20 40 60 80 100 120 140 160
VOLUME TO BE HANDLED IN TOWER RELATIVE TO VOLUME AT FEED

Fig. 2—Capacity of a topping tower at all points when using several methods of refluxing

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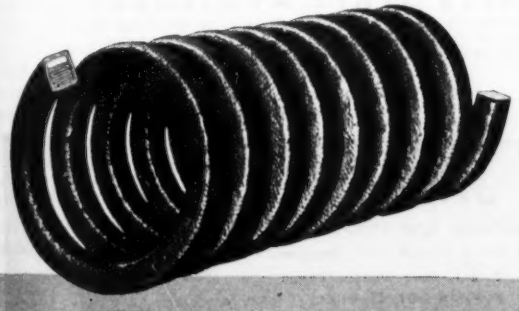

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Many similar alternatives are possible. One of the most promising would be to reflux the distillate draw plate with cooled distillate. This would give a curve intermediate between **Curves E and D.**

The diameter of tower required for each type of refluxing is nearly proportional to the square root of the capacity figures shown on Fig. 2. However, somewhat lower vapor velocities must be used for the heavy vapors found in the lower parts of the tower (gas oil, distillate, etc.) and hence, the capacities near the vaporizer would not be quite as small as indicated in **Fig. 2.**

In general, only an emergency or a very special market condition would justify the kind of operation outlined in the question.

Safe Arrangements of Oil Drains and Vents

(Continued from page 71)

entering the sump with the water because of failure of the interface-level control or for any other reason. When this is done a skimming baffle is installed in the closed drain sump so that oil will flow over the baffle into the sump pump section, and the water will overflow to the refinery sewer. The skimming baffle is required to minimize the amount of water pumped to tankage by the sump pump.

5. Drains for non-oil-bearing water carry surface drainage and condensate from steam traps through a vented gas trap to prevent gas from backing up from the refinery sewer into these systems.

6. Deck drains under floor-fired furnaces are provided to handle hot-oil spillage through the floor of the furnace in case of a tube failure. Each drain is provided with a steam connection to act as an eductor to facilitate drainage, and running water is provided to seal the drains and insure against gas backup. In some cases these drains are piped into the base of the blowdown stack; but, where there is not sufficient fall in the drain to the stack, foaming in the base of the stack may build up enough static head to back oil out of these drains. The system shown in **Fig. 3,** where furnace-deck drainage is put through a separate gas trap and then run to the refinery sewer, is therefore the preferred method of handling this drainage.

Drain Systems for Vapor-Recovery Units, Etc.

Typical drain systems for vapor-recovery units and other units processing light oils at higher pressures are shown in **Fig. 4.**

On these units a hot-oil pressure drain system is not required. The cold-oil pressure drains are piped to an underground drum which overflows to a sewer gas trap and thence to the refinery sewer. There are four main headers entering the closed drain sump:

1. A header into which the following hydrocarbon drains are connected: (a) oil released by the interface-level control from the cooling-tower water-disengaging drum as on catalytic cracking units; (b) exchanger relief-valve oil discharges, if not connected to the blowdown and flare stack as previously described; (c) pump-casing drains; (d) closed drains for flushing hydrocarbon sample connections. This header is not sealed below the liquid level in the sump, because the connecting lines to the header are from closed systems so that there is no danger of gas from the sump backing up. It is not combined with any other streams because of the possibility that very low temperatures from vaporization of light liquid hydrocarbons might freeze the moisture present in other streams entering the sump.

2. A header for the drain lines from relief-valve atmospheric vents. This header is sealed under the liquid level in the sump and is run separately so that any vapors from other headers

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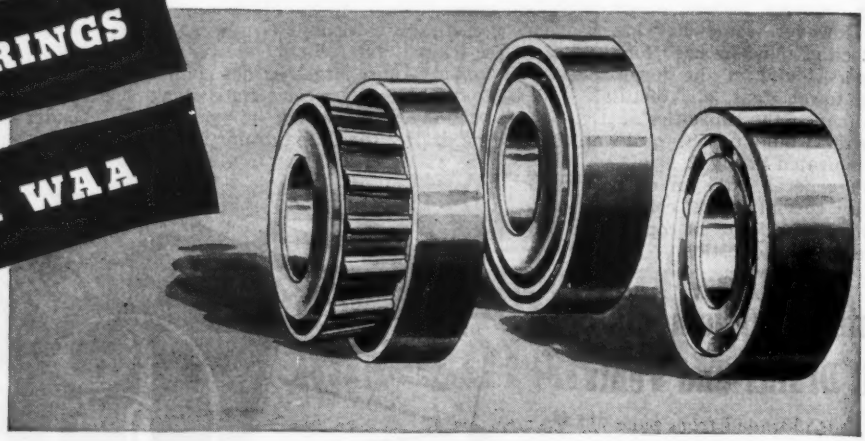

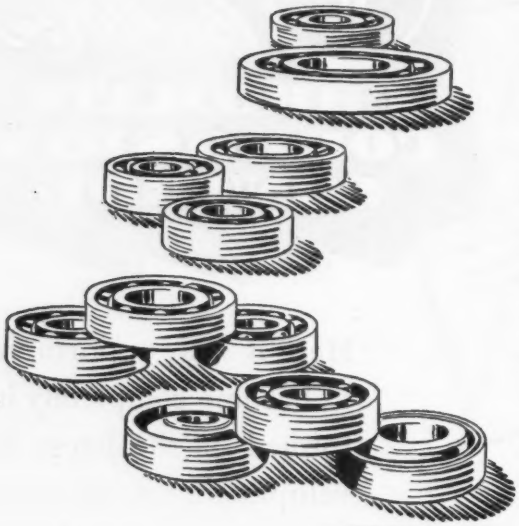

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1186

will not back out through the relief-valve vents. The valves in this system normally are left open so that any liquid leakage through relief valves vented to atmosphere will drain into the sump.

3. A separate header for reboiler steam condensate is provided to keep flashed steam from entering other systems and to avoid back pressure due to vaporization of light material if mixed with the hot condensate. Most of the reboiler steam condensate is piped to a steam flash drum and the condensate recovered for boiler-feed purposes. This connection to the closed-drain sump is for emergency use, and for diverting a small amount of steam condensate into the sump to aid in vaporizing light hydrocarbons before releasing to the refinery sewer. This header is sealed under the water level in the sump.

4. A separate header for process-water drawoff, for closed washing drains from the top of towers and drums, for draining water from the towers through the pumpout system after water washing, and for water relief-valve discharges. This header is also sealed under the water level in the sump to avoid gas backup.

Vent Systems

Purpose of vent systems on process units is safely to dispose of noxious or hydrocarbon vapors which are vented from process equipment during the course of operation or in starting up and shutting down, or which might leak from such equipment. These systems include the following:

1. Stuffing-box exhaust systems are provided on all pumps and compressors handling noxious vapors or volatile hydrocarbons. The removal system consists of duct work leading from the stuffing boxes into the suction of an exhaust fan which discharges the vapors at a safe location.

2. Venting facilities are provided for handling volatile materials when shutting down the entire unit or when removing any individual piece of equipment from service. A typical venting system for vapor-recovery units is shown in Fig. 5. Facilities are provided to depressure vessels, exchangers, and pumps by venting into the wet-gas system to reduce to about 0-5 psig. On units where no wet-gas system is available, pumps, exchangers, and vessels are depressured by releasing into the flare stack. A steam eductor is also provided for pulling down to a vacuum if desired. A spool, which is removed when the pump is in operation, is provided between block valves in each pump-depressuring connection to avoid inadvertent excessive venting from the pumps. Vessels are first depressured into the fuel-gas system down to about 25 psig. to avoid excessive venting into the wet-gas system. This connection to the fuel-gas system also serves for backing in fuel gas after steaming the vessels during startup. In cases where gas at higher than fuel-gas pressure is available, connections are also provided for pressuring vessels with this gas.

Pumpout Systems

Pumpout systems are provided to handle relatively large quantities of oil which, when cooled, are of sufficiently low vapor pressure to be pumped to refinery tankage. In some instances, as on the bottom of towers, connections are provided to both the pumpout and drain systems. It is usually preferable to use the pumpout system for all except emergency conditions when the pumpout system may be inaccessible or too slow.

Connections to the pumpout system are usually provided from vessels and the oil sides of exchangers, and in some cases from large trapped lines. Two or more separate pumpout systems may be provided, depending on the materials to be handled. For example, on catalytic cracking units, light and heavy oils are handled in separate pumpout lines manifolded to a common pump; a separate slurry drain header, pump, and cooler box are provided which can be cross-connected with the heavy-oil pumpout system.

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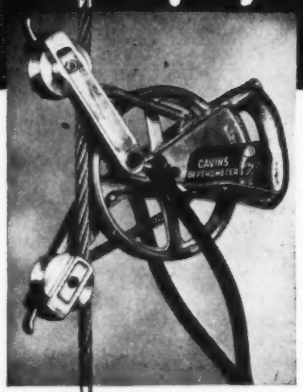

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Hydraulic Torque Converter Finds Increasing Application

HYDRAULIC transmission in general, and the hydraulic coupling have been discussed in the preceding installment. The hydraulic torque converter, with characteristics different from those of the coupling, is another type of hydraulic drive, which found in recent years an increasing application in rotary-rig service.

Hydraulic Torque Converter

The converter consists of three parts, the impeller, the stationary reaction blades, and the turbine. The impeller driven by the engine imparts the rotating motion to the fluid within the housing. The stationary blades direct the flow of the fluid to the turbine blades, which absorb the kinetic energy of the fluid. The reaction blades change the torque ratio between the input and the output shaft. The reaction torque is added to the input torque with the resulting increase of the torque at the output shaft.

The type of the converter now used consists of two sets of stationary blades and three sets of turbine blades. (Fig. 25.)

Characteristics.—As was the case with the hydraulic coupling the power-transmitting capacity of a converter is proportional to the cube of speed of the driving member and the fifth power of the diameter. The torque capacity of the converter is proportional to the square of speed of the driven member and the fifth power of the diameter. The torque of the output shaft varies from that equal the engine torque at about three-fourths of the engine speed to that equaling five times the engine torque at the stalling point of the output shaft.

Important from the point of view of the efficiency of the converter is the ratio of the output to the input speed. The output speed may vary from full engine speed to zero. To stay, however, within the flat portion of the efficiency curve of the converter, where the efficiency ranges from 75 to 85 per cent, the output speed should be between 25 and 75 per cent of the input speed. For any given ratio of speeds the efficiency of the converter is a constant. As the engine speed is reduced and the output shaft speed decreases also, the efficiency remains unchanged. It is possible therefore to handle light loads with high efficiency.

Application

The above outlined characteristics make the converter particularly adapted to hoisting operations and it is in this role that the converter found during the last few years its principal application in the rotary rig. At the present stage of development (Installment 22) the converters are used with hoists of well-servicing units and of drilling rigs designed for moderate depths. It should be noted here that the driven elements must be specially designed for service with a torque converter. The high torque, which the output shaft of converter is capable of developing, must be considered. Also, the ratios must be such that the converter operates within its efficient range. In other words, the hydraulic torque converter cannot be simply added to the conventional transmission system of a drilling rig.

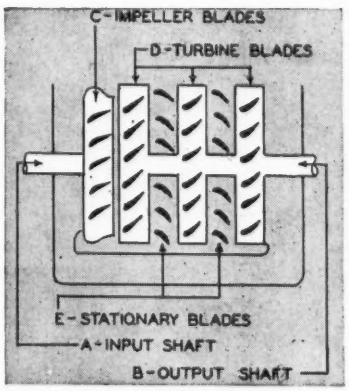

Fig. 25—Schematic diagram of a three-stage hydraulic torque converter

The advantages of use of a converter during hoisting operations include, first, full utilization of the available power of the engine. In case of rigs with mechanical transmission, the power delivery of the engine decreases in each speed during pulling out of pipe. This is because of lightening of load as the stands are removed with engine speed held constant by the governor. (Installment 14.) In the converter-equipped rigs the speed of hoisting in any given gear increases as the load becomes lighter and the power of the engine is fully utilized. Numerous field tests have been made of time needed for pulling out of individual stands by the converter equipped rigs. These tests indicate clearly the decrease in time needed for pulling out of each stand as the load becomes lighter.

High starting torque, rapid acceleration, and wide selection of speeds and torques for different operations of the hoisting cycle of each stand are other advantages of the torque converter during the hoisting operations.

Use of the converter is advantageous also in other operations involving draw works, such as fishing, certain types of drilling, swabbing, and bailing.

Application of the converter to other elements of the rotary rig, such as rotary table and pumps will be discussed later in the series.

References

1. T. P. Sanders, "Torque Converters Applied to Drilling and Servicing Rigs," The Oil and Gas Journal, July 2, 1942.

Also references 3, 4, and 5 given in the preceding installment.

No. 23 in a series by Joseph Zaba, petroleum engineer, Houston

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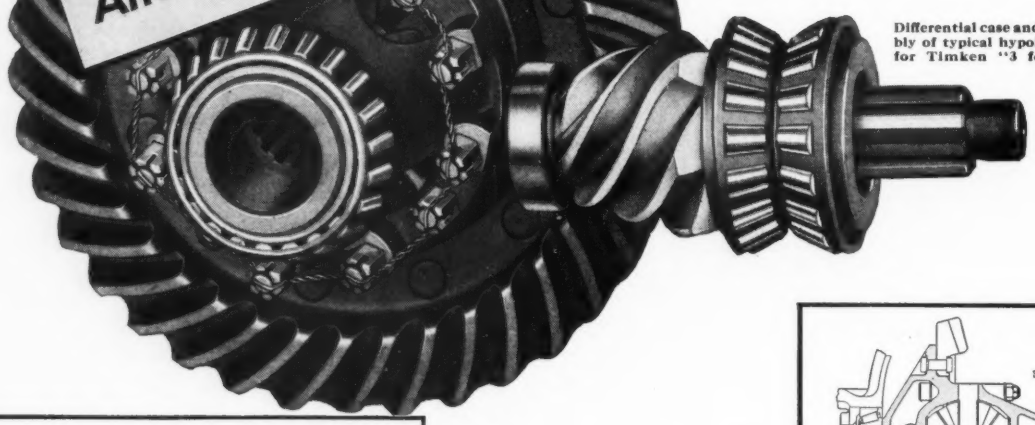

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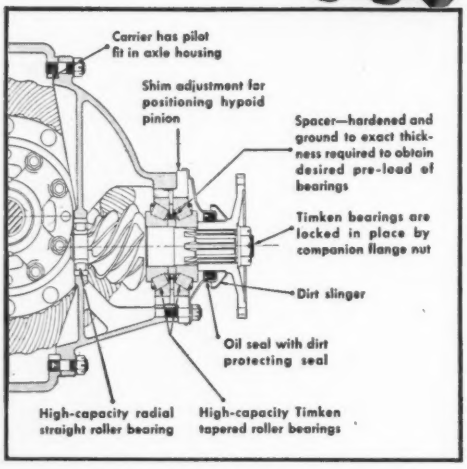
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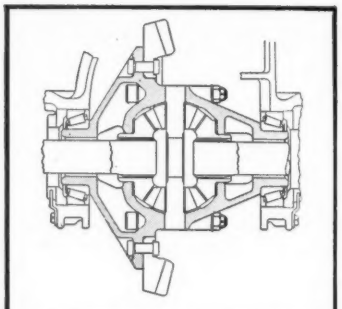

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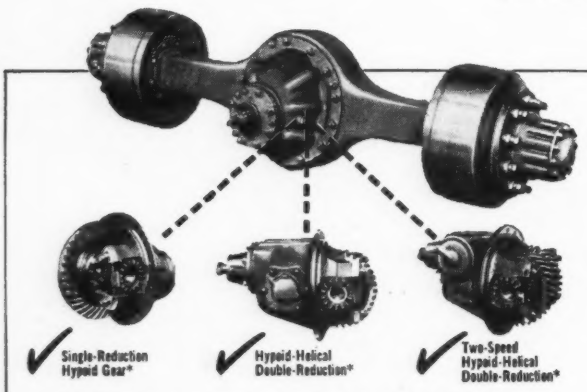

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The Refiner's Notebook

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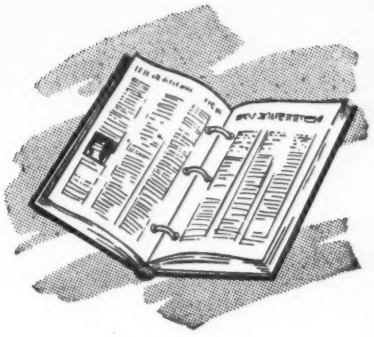


Reciprocating-Pump Calculations - Part 2

REFINER'S NOTEBOOK NO. 144, May 17, 1947, on this same topic discussed:

1. Types of pumps and pump terms.
2. Fluid head.
3. Volumetric efficiency
4. Hydraulic efficiency.
5. Mechanical efficiency.
6. Piston speed.
7. Discharge pressure.

Capacity.—This depends primarily on liquid cylinder diameter (D_L), piston speed (S) or strokes per minute (n), volumetric efficiency (E_v), and number of liquid pistons (N). For **double-acting** pumps:

$$GPM = 0.0408\ D^2_L\ SNE_v$$

$$\text{or, } GPM = 0.0408\ D^2_L\ nlNE_v$$

in which:

D_L = liquid cylinder diameter, in.
n = strokes per minute (total movements of one rod in both directions).
l = stroke length, in.
S = nl, piston speed, ft. per min.
N = 1 for simplex
2 for duplex
3 for simplex
E_v = volumetric efficiency.

No correction is made in these formulas for the volume of the pump rod. If such a correction is necessary, the following term can be subtracted from the equation—$0.0204\ d^2SN$ or $0.0204\ d^2nlN$.

The above formulas apply only to double-acting pumps. For **single-acting** pumps, notably the triplex plunger pumps or center-packed two-cylinder plunger pumps, the equations should be divided by 2.

As a **short-cut** approximation the capacity in gallons per minute of a duplex pump is equal to one-half of the diameter squared times the length of stroke (inches). (The Oil and Gas Journal, p. 83, February 25, 1943).

$$\text{Duplex} = 0.5\ D^2l$$
$$\text{Simplex} = 0.25\ D^2l$$
$$\text{Triplex} = 0.75\ D^2l$$

Steam consumption.—This is dependent only on liquid capacity, liquid and steam pressure, and mechanical efficiency. The diameter of the steam cylinder is of little significance because the steam is throttled downward in pressure by the steam valve to whatever pressure is necessary to cause the piston to move, i.e., if the steam cylinder is large the steam expands a lot as it enters the cylinder whereas if the cylinder is smaller, less expansion takes place.

Duplex:

$$\text{lb. steam} = \frac{1{,}800}{E_m} \times \frac{G\triangle P_L}{v\triangle P_s} = 4.5\,\frac{G\triangle P_L}{E_m}$$

Simplex:

$$\text{lb. steam} = \frac{1{,}620}{E_m} \times \frac{G\triangle P_L}{v\triangle P_s} = 4\,\frac{G\triangle P_L}{E_m}$$

in which "v" is the specific volume of the steam in cubic feet per pound. The simplified formulas (lacking $v\triangle P_s$) are approximations based on the fact that the product of v and of $\triangle P_s$ is nearly a constant (plus or minus 3 per cent for 100 to 150-psig. steam). The constants 1,800, 1,620, 4.5, and 4 provide an allowance of 15 per cent for the clearances of the steam cylinder and 75-100 per cent for condensation, stuffing-box leaks, etc. as suggested by H. P. Henderson of Worthington Pump & Machinery Corp. (Petroleum Eng. Reference Annual, p. 309, 1943). Refiner's Notebooks Nos. 146 and 148 (May 31 and June 14) are tabulated steam consumptions for different types of pumps.

As a conservative **short-cut method,** steam consumption can be computed by noting that 100 g.p.m. at a pressure of 100 psi. can be pumped with 1,000 lb. of steam per hour (The Oil and Gas Journal, p. 46, March 11, 1943).

Example.—160 g.p.m. can be pumped at 180 psig. if the suction is at 14.7 psig. with 2,880 lb. of steam per hour.

$$1{,}000 \times \frac{160}{100} \times \frac{180}{100} = 2{,}880 \text{ lb.}$$

Pump horsepower.—The power required by the liquid cylinders or fluid end of the pump, stated in three sets of convenient units, is:

$$Hp. = \frac{Wh}{33{,}000} = \frac{\triangle P_L G}{1{,}713} = \frac{Ghd}{3{,}957}$$

in which:

W = liquid weight, lb. per min.
h = head, feet of fluid
G = g.p.m.
$\triangle P_L$ = discharge pressure minus suction pressure, psi.
d = specific gravity

However, the power required at the liquid end is of little direct use; what is really desired is the horsepower of the driving mechanism (steam cylinder, engine, motor, etc.). The liquid-end horsepower shown above must be divided by the hydraulic efficiency (usually negligible), the mechanical efficiency of the liquid-end cylinders, the efficiency of the connecting mechanism (usually negligible except in case of gear-box reduction), and the efficiency of the driver (engine, motor, or steam cylinder).

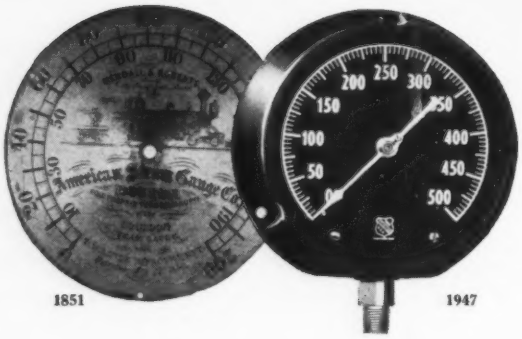
As a conservative **short-cut method,** actual horsepower required (based on an over-all efficiency of 72 per cent) can be estimated by noting that 9 hp. will pump 100 g.p.m. of liquid through a pressure range of 100 psi. (see The Oil and Gas Journal, February 11, 1943, p. 43). This short cut applies to all common pumps (including centrifugal) and drivers except gear-driven units.

Example.—160 g.p.m. can be pumped at 180 psig. (atmospheric suction) with about 25.9 hp.

$$9 \times \frac{160}{100} \times \frac{180}{100} = 25.9$$

Notice.—The performance of reciprocating pumps with respect to capacity, speed, discharge pressure, and steam consumption has been tabulated for common sizes of pumps in The Refiner's Notebook No. 143 (May 10, 1947).

No. 147 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa



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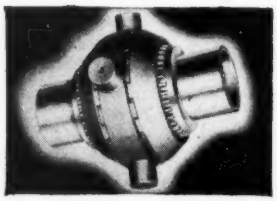
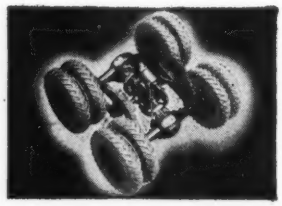


Time is money! A stuck truck costs *both* time and money. With a NoSPIN Differential installed in your truck, your vehicle can't get stuck in mud, snow or ice as long as one driving wheel has some footing. Thousands of truck owners have realized greater profits from time saved by using NoSPIN Differentials.



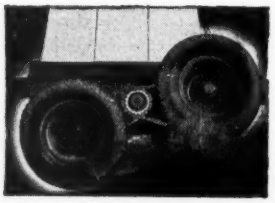
DETROIT AUTOMOTIVE

THORNTON DRIVE

Increased payloads mean increased profits! Put your medium (1½-2 ton) truck in the heavy class by installing a Thornton Drive. Four independently-driven rear wheels for greater traction, G.V.W. up to 32,000 lbs., performance and earning power increased 100%—yet you still have the economy of a medium truck.

DETROIT AUTOMOTIVE

4-CHAIN DRIVE



For heavy hauling and tough going, you can't beat the Detroit Automotive 4-Chain Drive. Installed on your heavier chassis, this rugged unit gives you a powerful six-wheeler with a G.V.W. up to 44,000 lbs. Maximum traction from positive 4-Chain drive together with big payloads mean *profitable performance* under any conditions.

DETROIT AUTOMOTIVE

PRODUCTS CORPORATION

(Formerly Thornton Tandem Co.)

8701 Grinnell Ave. • Detroit 13, Michigan

Distributors:

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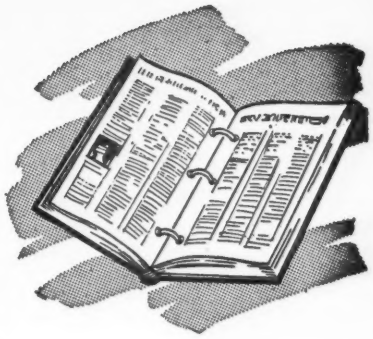
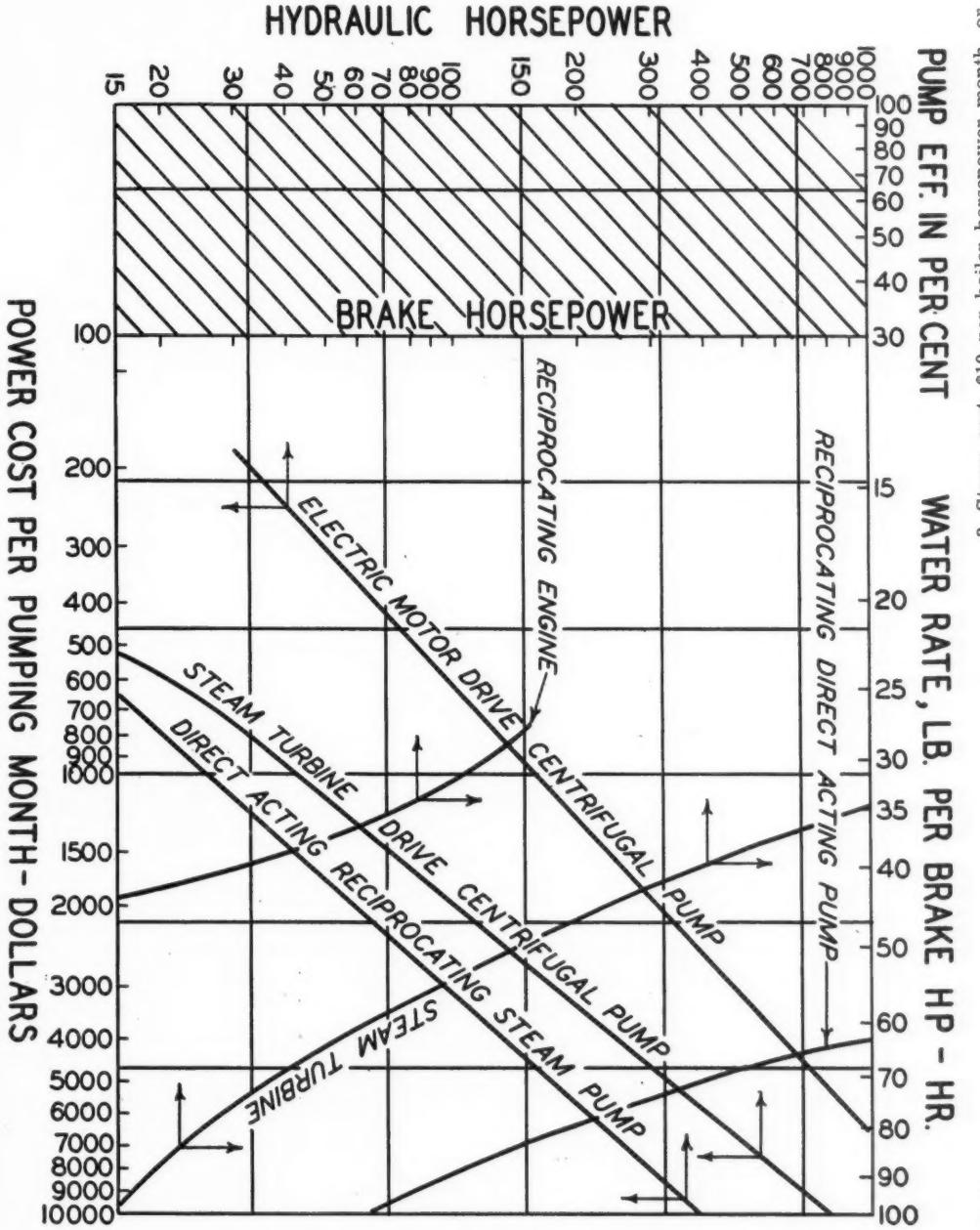
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



Pumping Costs

This page replaces Installment No. 145, which appeared in the issue of May 24. An unfortunate error in drafting resulted in the omission of a significant portion of the curves, making the chart too incomplete to be of value.


HYDRAULIC HORSEPOWER
15 20 30 40 50 60 70 80 100 150 200 300 400 500 600 700 800 900 1000
BRAKE HORSEPOWER
POWER COST PER PUMPING MONTH - DOLLARS
100 200 300 400 500 600 700 800 900 1000 1500 2000 3000 4000 5000 6000 7000 8000 9000 10000
PUMP EFF. IN PER CENT
100 90 80 70 60 50 40 30
WATER RATE, LB. PER BRAKE HP - HR.
15 20 25 30 35 40 50 60 70 80 90 100
ELECTRIC MOTOR DRIVE CENTRIFUGAL PUMP
RECIPROCATING ENGINE
STEAM TURBINE DRIVE CENTRIFUGAL PUMP
DIRECT ACTING RECIPROCATING STEAM PUMP
STEAM TURBINE
RECIPROCATING DIRECT ACTING PUMP

Basis:
1. Steam pressure is 85 psig. at equipment.
2. Exhaust pressure is 5 psig.
3. Steam cost, $10 per boiler horsepower month, or, about 41.5 cents per thousand pounds steam.
4. Electric power cost, 1 cent per kilowatt hour.

Reference: W. R. Layne, Centrifugal Pumps in the Oil Industry, Trans. A.S.M.E., Pet. 51-3, pg. 53.

No. 145 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

Installing Anaconda Arsenical Admiralty Tubes in tube bundle at Lemont, Illinois plant of Globe Oil & Refining Co. (Inset) Lowering a tube bundle into open top water box.

Built to combat POLLUTED WATER *and* HOT GASOLINE VAPORS

THE ABOVE PHOTOGRAPHS were taken at the Lemont, Illinois plant of the Globe Oil & Refining Company. They show equipment used for condensing cracked gasoline vapors from the crude cracking unit prior to stabilization and treating.

The condenser consists of a battery of tube bundles equipped with Anaconda Arsenical Admiralty Tubes, connected in parallel. The whole unit is submerged in an open top water box.

According to the Chief Engineer of Globe Oil, Anaconda Arsenical Admiralty Tubes have proven very satisfactory in withstanding undesirable chemical constituents of polluted water, the only coolant available.

The American Brass Company pioneered in the development, and for many years has specialized in the manufacture, of condenser and heat exchanger tubes. For detailed information on Anaconda Condenser Tubes and Tube Sheets, and on the helpful service offered by our Technical Department, write for Publication B-2. 46169

ANACONDA

Anaconda

CONDENSER TUBES

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

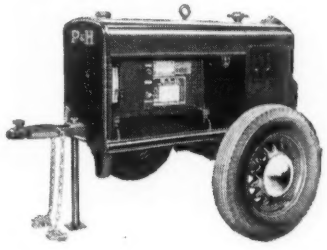
by John M. Spears

(1) NEW RADIOTELEPHONE provides efficient and economical communication for wildcat and exploration drilling, scattered producing leases, pipe-line operations, offshort drilling locations, supply barges, maintenance

craft, and company utility boats, etc. It's as easy to use as placing a telephone call. Unit's dimensions are 15 by 9 by 10 in. Construction is of heavy-gage metal to withstand vibrations. Features include four crystal-controlled transmitting and receiving channels, plus tunable broadcast band in receiver. Unit is complete, including tubes, handset, three transmitting and three receiving crystals, and built in power supply. *Fisher Research Laboratory, Inc.*

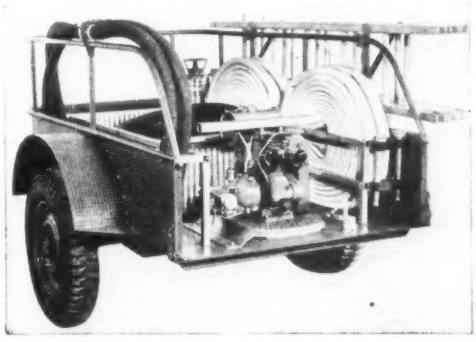
IT'S NEW ✓ CHECK IT

(2) SELF-POWERED ARC WELDER, available as a stationary or trailer unit, is an N.E.M.A. rated machine of 200 amp., but has a welding service range of from 30 to 260 amp. One control gives any desired welding heat from minimum to maximum capacity. Arc response is automatic on all classes of work and with all types of electrodes. Rates 30 volts at 2,900 r.p.m., generator is self-excited by a set of auxiliary brushes mounted on a brush-holder rocker in advance of the main brushes. A heavy-duty, four-cylinder, air-cooled engine of 26.5 hp. supplies power. A five-strand belt is used for positive power transmission. Carried on a running gear of standard track width, the trailer welder has standard-size pneumatic tires as regular equipment. Unit tracks very easily over the back roads and tows at normal highway speeds with a complete absence of side sway. *Harnischfeger Corp.*



IT'S NEW ✓ CHECK IT

(3) FIRE-FIGHTING UNIT for oil-field and refinery application is mounted on a sturdy two-wheeled trailer, and consists of a gasoline-driven high-pressure utility pump, 75 ft. of supply hose and 250 ft. of fire hose, an 18-ft. three-section extension ladder, fire axe, and hand-



type extinguisher. Unit, easily attached to automobile or truck, carries a 48 by 78-in. steel-box body mounted on heavy-duty tires of standard automobile center-to-center track. Pump is independently powered, capable of delivering over 40 U. S. g.p.m. at 120 lb. pressure. A 4-cycle, 5-hp. gasoline engine is mounted integrally with the pump. Any water source serves the unit. *Porto-Pump, Inc.*

IT'S NEW ✓ CHECK IT

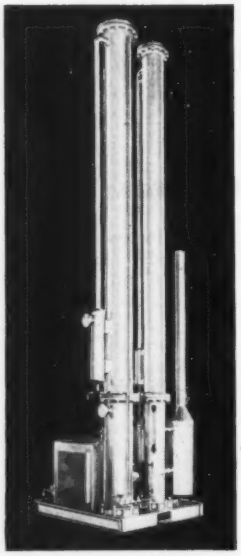
The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

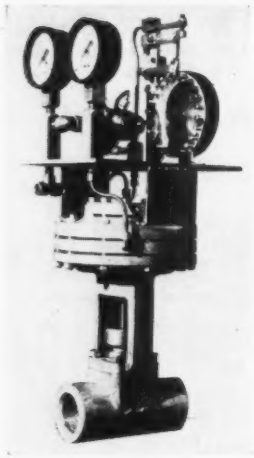
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

(4) HYDROGEN SULFIDE REMOVAL UNIT is a self-contained, portable, direct-fired, air-cooled unit for the purification of drilling rigs or compressor-station fuel gases. It also is applicable to individual sour-gas wells. The unit employs the ethanolamines as regenerative liquid-purification medium. Standing 18 ft., unit can be disconnected at its flanges to facilitate shipping. Dimensions at the base are 5 by 5 ft. 8-in. Simple in operation, the unit requires only that the operator bolt the top section to the lower section and run the gas line to and from the plant. Entirely automatic, it requires little attention thereafter, and no utilities at all. *Graff Engineering & Equipment Co.*



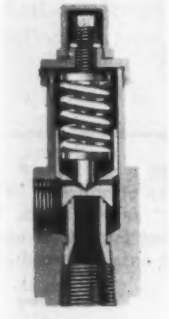
IT'S NEW CHECK IT



(5) NEW SURFACE CONTROLLER for intermittent gas-lift operations, combines regulation with time-cycle control. Unit operates as a regulator when valve is open, thereby using only gas sufficient to complete an injection cycle with lowest possible gas-oil ratio. By merely adjusting pilot pressure, unit can be made to operate as a straight time-cycle controller if so desired. When the injection cycle starts and desired casing pressure buildup is reached, unit, acting as a regulator, closes the valve, independent of time-cycle unit, and holds casing pressure constant until time-cycle unit closes. Controller may also be used as a gas-pressure regulator, back-pressure valve, and stop-cocking unit. *Merla Tool Corp.*

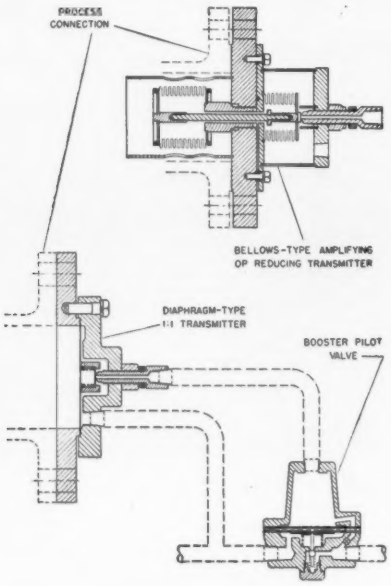
IT'S NEW CHECK IT

(6) NEW RELIEF VALVE for pressures up to 10,000 psi. is fabricated completely from bronze, cold-rolled steel, or stainless steel depending on its intended service. Disk and nozzle are of stainless steel. Interchangeable nozzle inserts provide for proper capacity at set pressures in three ranges —2,000, 5,000, and 10,000 psi. High flow capacity, with a coefficient approximating unit, is obtained by high lift of disk brought about by high kinetic energy of the discharge developed by venturi action of the nozzle. Top-guided disk piston with its two-point bearing surface is completely free acting. Both bottom inlet and side-outlet connections are tapped directly in valve body. Nozzle seat is well above the drain line, hence remains dry and is not subject to accumulations of scale or sediment. *Farris Engineering Corp.*



IT'S NEW CHECK IT

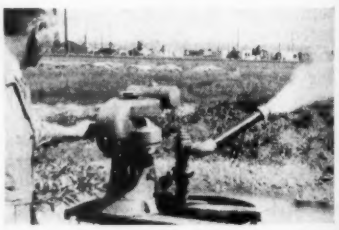
(7) NULLMATIC PRESSURE TRANSMITTER is for liquid level and pressure applications. New bellows-type instruments are designed to measure process pressures in ranges as small as 1 psi. or as large as 200 psi. and to transmit a range of air pressures which suit standard



pneumatic receivers. All transmitters operate on the pneumatic "null" balance principle and use a booster pilot valve as shown in the schematic diagram. The operation of the booster pilot maintains a constant differential pressure across the pilot nozzle in the transmitter, to balance the bellows or diaphragm at essentially a null position for all values of the process pressure. High-overload protection is provided. *Moore Products Co.*

IT'S NEW CHECK IT

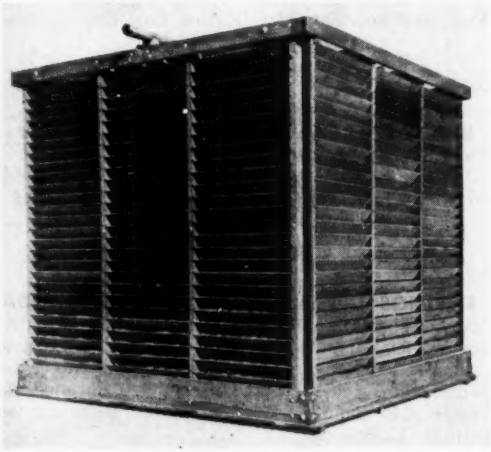
(8) GASOLINE-ENGINE DRIVEN PUMP supplies water for drilling rigs, leases, and other oil field uses. Vertical shaft arrangement of engine provides a compact design. Pump has only one moving part, a cast bronze impeller with stainless steel shaft, which is directly coupled to engine crankshaft. This construction provides a minimum of wearing parts while maintaining a sturdy design which will withstand rough handling and continuous use. Engine is a two-cycle type, using all antifriction bearings and high-pressure aluminum die-cast alloy. It is equipped with a patented scavenging system and is easy to start by virtue of the scavenging system together with the builtin high-tension magneto which utilizes Alnico V permanent magnet ma-



terial in the magneto rotor. *Diesel Pump & Electric Mfg. Co.*

IT'S NEW CHECK IT

(9) SPRAY-TYPE COOLING TOWER may be added to at any time as expansion is required and used for open or closed cooling systems. Standard atmospheric sections are easily installed at any time for closed-system cooling.



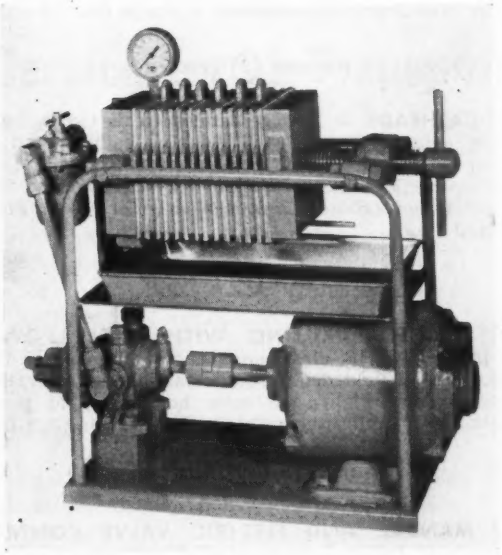
Unit will withstand 100 m.p.h. wind. Heavy select heartwood lumber is used throughout with galvanized bolts and special hardware at critical joints. Has capacity of 65 to 1,580 g.p.m. or more of water. Spray nozzles provide excellent spray pattern. *Marley Co., Inc.*

IT'S NEW CHECK IT

(10) NEW ROTARY HOSE has high strength, combined with increased flexibility. It can easily be bent in loops 30 in. in diameter without the slightest damage or measurable distortion. Its flexibility makes the loading rack unnecessary and its lighter weight makes handling even easier. A new streamlined Barney coupling is used on hose. Coupling weighs one-third less yet loses none of its strength. *Goodall Rubber Co.*

IT'S NEW CHECK IT

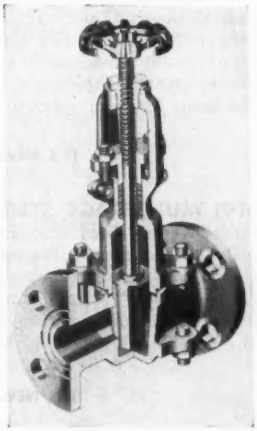
(11) PORTABLE FILTER PRESS weighs only 70 lb. and is capable of high-efficiency filtration at the rate of 60 gal. per hour. Incoming fluid is first passed through a Cuno filter which removes all colloidal particles. 0.0035 in. or larger. This feature serves the twofold purpose of protecting the high-output gear pump and increasing efficiency of filter press itself. A builtin relief valve maintains fluid pressure below 60 psi. without interrupting the filtration process. Pump is driven by a



1/6-hp., 1,200-r.p.m. motor suitable for operation on a 110-volt, 60-cycle power supply. *Buckeye Laboratories Corp.*

IT'S NEW CHECK IT

(12) NEW PLUG-GAGE VALVE provides straight-through flow in the wide-open position as do conventional gate valves, yet it is as suitable for throttling service as conventional globe valves. Design permits very close throttling at both high and low velocities. Valve resists cutting action of fluid when in a throttled position and will not stick in the closed position. There is no tendency to galling. Valves have bolted bonnet joints and are available with either screwed or flanged ends in sizes from ½ to 2 in. *Crane Co.*



IT'S NEW CHECK IT

TRADE LITERATURE

(13) PILOT - OPERATED PRESSURE CONTROLLERS (snap-acting relay type). An eight-page, 8½-by-11-in. bulletin pictures and describes snap-acting Wizard pilots. Information on general application and usefulness in the flow control of oil wells is furnished. *Fisher Governor Co.*

IT'S NEW CHECK IT

(14) DIE FORGINGS CHART. Determining commercial tolerances for closed-impression die forgings has been made simple and quick by new chart. This graphic presentation of all essential factors enables the user to determine almost instantly the commercial tolerances for any style, shape, and weight of forging up to 500 lb. Chart reveals tolerances for dimensions of thickness, width, and length. Punched for a standard three-ring binder. *The Steel Improvement & Forge Co.*

IT'S NEW ✓ CHECK IT

(15) CATHEADS. A 14-page catalog treats two catheads popular on drilling rigs—the spinning cathead and the master breakout cathead. Installation and clutch adjustment instructions are accompanied by cathead and foot-control dimensional drawings. Parts list included. *Foster Cathead Co.*

IT'S NEW ✓ CHECK IT

(16) OIL-FIELD DRILLING WITH DIESEL POWER. The part played by diesel engines and diesel track-type tractors in oil-field drilling and maintenance operations themes a new eight-page color booklet. Field photographs show applications. *Caterpillar Tractor Co.*

IT'S NEW ✓ CHECK IT

(17) MANUAL AND ELECTRIC VALVE CONTROL. A two-color folder describes and illustrates valve controls to operate any valves for a particular job. Current used only to open or close valve, fast or slow operation, automatic safety shut off are only a few features treated. Cutaway drawing with nomenclature emphasizes operation and minimum operating parts. *Shafer Valve Co., Inc.*

IT'S NEW ✓ CHECK IT

(18) SPEED. Action story of air express in 32 pictures and 12 pages is portrayed in pictorial bulletin. Story begins with wire to the supplier—the start of many shipments—and ends with prompt and safe delivery. Also treats around-the-world service. *Air Express Division of Railway Express Agency, Inc.*

IT'S NEW ✓ CHECK IT

(19) MULTISTAGE STEAM TURBINE. New eight-page bulletin describes and illustrates the Type C horizontally split turbine. Technical data include specifications, steam-consumption curves, maximum brake-horsepower curves, back-pressure and superheat-connection curves, and an outline and dimensions drawing. *Carling Turbine Blower Co., Worcester, Mass.*

IT'S NEW ✓ CHECK IT

(20) MATERIAL HANDLERS. New 36-page, 3-color catalog covers a complete line of industrial tractors including battery-powered fork-truck models, towing-tractor model, and gas-powered fork-truck models. Descriptive matter contains illustrations and dimensional specifications. *Clark Trucktractor Division, Clark Equipment Co.*

IT'S NEW ✓ CHECK IT

(21) PNEUMATIC TOOLS. A 65-page catalog treats many pneumatic tools: drills, nut setters, screw drivers, grinders, chipping hammers, riveting hammers, compression riveters, air hoists, special air motors, and accessories. Material is complete with illustrations, specifications, and how to order. *Keller Tool Co.*

IT'S NEW ✓ CHECK IT

(22) ROTARY TABLE. Series of three-color broadsides describe manufacturer's rotary tables for shallow and deep drilling. Construction features and advantages included with illustrations of units. *The Wheland Co.*

IT'S NEW ✓ CHECK IT

(23) FITTINGS DIMENSIONAL AND WEIGHT DATA. New pocket-size folder gives dimensions and weight tables for 45°-90° ells, 180 returns, straight tees, caps, stub ends, shaped nipples, reducing-outlet tees, and reducers (concentric and eccentric). This quick-reference easily read table also includes illustrations of seamless welding fittings. *Ladish Co.*

IT'S NEW ✓ CHECK IT

(24) HYDRAULIC REMOTE CONTROL. A two-color, eight-page bulletin covers a hydraulic remote control unit for oil-field operations involving a single or multi-engine set up. Control consists of a transmitter and a receiver, connected by a single tube. Applications and general dimensions treated in blue-print style. *Hopeman Equipment Co.*

IT'S NEW ✓ CHECK IT

(25) LINEAR CONVERSION TABLE. Linear table converts inches and fractions of inches to decimal parts of a foot. Table should effect savings of time for those who deal with products, such as tubing, generally sold and quoted on a per-100-ft. basis. *Babcock & Wilcox Tube Co.*

IT'S NEW ✓ CHECK IT

(26) TURBINES, PUMPS, AND COMPRESSORS. New 24-page bulletin presents manufacturer's products in pictorial form. Descriptions accompanying illustrations include applications, design, and mechanical features. *De Laval Steam Turbine Co.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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The RATTLER

One of 4 Poisonous Snakes, including 41 species, some of which are found in every state

Every Outdoor Workman needs this protection!

McDonald SNAKE BITE KIT

A handy kit with all the materials for instant, safe treatment of snake bites. Powerful suction pump with two adaptors—operates with one hand. Real surgical lancet, tourniquet, antiseptic, adhesive compress, shock treatment. Full directions on inside cover of kit. Fits pocket or standard unit kits.

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Santa Fe

"Stand-by Service" for Air Transport

Santa Fe, one of America's great transportation systems, is offering to expand the scope of its public service by establishing an air operation to carry mail and freight in Santa Fe territory. Applications for that purpose have been filed with the Civil Aeronautics Board.

As far back as 1928 Santa Fe recognized the importance of air speed as a vital factor in our national transportation system and participated in the country's first "air-rail" service.

Since then, Santa Fe has done much in furthering the interests of America's air transport system.

"Ground Facilities"—Ready and Willing

Fortunately, Santa Fe's long leadership in serving the vast West and Southwest provides the right locations and a physically up-to-date and "going" plant on which to build, quickly and efficiently, a complete "stand-by service" for air transport.

Important Santa Fe Advantages

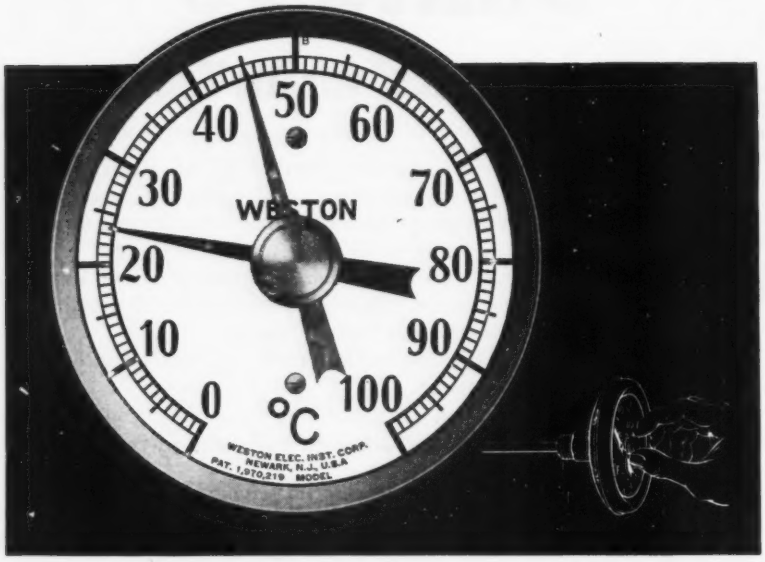
Santa Fe provides such advantages as the greatest fleet of diesel power in railroading, giant diesel trucks and trailers readily available at strategic points, America's largest private communications system, ample station and warehouse facilities with modern handling devices all along the line.

In addition, 70,000 Santa Fe people have the real "know-how" of getting freight from its origin to its destination, faster, more carefully, more safely.

That's why we say, in co-operation with air transport, too . . . *Santa Fe—that's the system.*

SANTA FE SYSTEM LINES
Serving the West and Southwest

THE THERMOMETER THAT *REMEMBERS!*



WESTON

all metal

MAX-MIN* THERMOMETER

What's the present processing temperature?

What was the highest temperature reached since last reading?

You want the answers to both these questions—and the MAX-MIN gives them . . . accurately!

The red index pointer on the MAX-MIN is manually set to either the low or high side of the main indicating pointer. When set on the high side, for example, it moves as the temperature increases, always remaining at the extreme temperature reached, until manually re-set. Thus one quick reading gives both *present* temperature and the *peak* temperature since last reading.

For complete details see your jobber or local Weston representative. Weston Electrical Instrument Corporation, 673 Frelinghuysen Avenue, Newark 5, New Jersey.

**Registered Trade Mark*

WESTON *Instruments*

TAPECOAT *Those "Weak Links"*

In Your Fight Against Corrosion...

It doesn't make sense to protect pipe with quality coatings and then use makeshift protection on pipe joints. After all, protection is only as good as its weakest joint.

That's why more and more distribution engineers are standardizing on TAPECOAT—the dependable wrapping in tape form that provides pipe joint protection equivalent to the mill coating on the pipe.

TAPECOAT is easy to apply. You simply spiral wrap the joint, starting and ending on the mill coated pipe, thus making the protection on the joint equal to the coating on the pipe. It will pay you to guard against those "weak links" with TAPECOAT.

Write for complete details.

The TAPECOAT Company

1523 LYONS STREET EVANSTON, ILLINOIS

REFINING

Texas Co. to Expand West Tulsa Refinery

AN expansion program to cost several million dollars which will increase capacity of the West Tulsa refinery of The Texas Co. from 20,000 to 30,000 bbl. daily is scheduled to get under way late this summer or early this autumn.

Present plans call for replacing the plant's two batteries of shell stills, with eight stills to a battery, and its present thermal cracking equipment with new equipment. New crude pipe stills and Fluid catalytic cracking and recovery units will be erected.

Also to be added to the plant are a catalytic polymerization unit, an acid treating and a sweetening plant, additional steam-generating equipment, additional water-cooling facilities, and other auxiliary equipment.

The new facilities will permit the plant to process West Texas and New Mexico crude oil, supplementing its present supplies from Oklahoma, Kansas, and Texas.

E. M. Reynolds, plant superintendent, said the expansion program would take from 1½ to 2 years to complete. The Texas Co. recently completed an expansion program in its Casper, Wyo., refinery.

Company officials withheld an announcement of the estimated cost of the construction program "due to changing conditions" regarding material and labor.

Bareco Plans $500,000 Program at Wichita

Bareco Oil Co., Tulsa, has concluded arrangements for expanding and modernizing its Wichita, Kans., refinery, according to V. R. Oakley, vice president in charge of manufacturing.

The program includes a Perco catalytic desulfurization - catalytic reforming unit, licensed by Phillips Petroleum Co., Bartlesville, Okla.; replacement and modernization of steam generating facilities; and refined products' storage which will include additional tankage and facilities for packaged lubricating - oil storage. Consideration is also being given to additional equipment for recovery of propane and butane for L.P.G.

Total expenditures at the Wichita refinery are estimated at approximately $500,000. Koch Engineering Co., Wichita, Kans., has contracted for the engineering and construction work for the Perco unit and the entire modernization program is scheduled for completion late in 1947. The Bareco refinery's present capacity is listed at 7,000 bbl. crude and 3,200 bbl. cracking daily.

Mid-Continent Announces $3,500,000 Expansion

Preliminary work in a $3,500,000 expansion program already is under way in the West Tulsa refinery of Mid-Continent Petroleum Corp., company officials have announced.

The program, which will include installation of a catalytic cracking unit by M. W. Kellogg Co., is expected to be completed late next summer. The expansion will increase the plant's capacity from about 35,000 bbl. daily to 45,000 bbl. daily.

The new cracking unit, on which construction is scheduled to begin about February of next year, will supplement present thermal cracking facilities. Work on the new cracking unit is expected to require about 6 months.

Ethyl Corp. to Build Three Storage Plants

Plans to construct three bulk-storage and distribution plants for Ethyl antiknock fluid at an estimated cost of $2,000,000 have been confirmed by Ethyl Corp. A combined storage capacity of 30,000,000 lb. is caled for, with locations at Edge Moor, Del., and Western Junction, south of Los Angeles. Location of the third plant, possibly somewhere in the Mid-Continent, has not been determined.

A company spokesman explained that the storage terminals are being built as a result of the expiration, at the end of 1947, of Ethyl's lease of the TEL manufacturing plant at Deepwater, N. J. Operation of this plant for Ethyl will be discontinued by E. I. du Pont de Nemours & Co., which previously announced plans for manufacturing and selling antiknock motor fuel on its own account.

Currently, Ethyl Corp. distributes to refineries from the Deepwater and Baton Rouge, La., plants.

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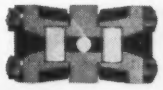

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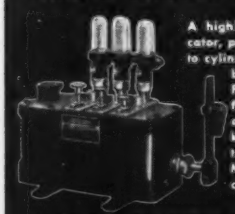

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is slated to start on the Delaware and California plants in the hope that partial service will be possible by this fall. Completion is expected by early next spring. The Edge Moor plant reportedly will occupy 23 acres and cost approximately $600,000.

Socony-Vacuum Develops New Cutting-Oil Line

A new line of cutting oils designated as the "Cuprol" line and said to prevent discoloration during the machining of high-conductivity, oxygen-free copper for radar and electrical equipment, has been announced by Socony-Vacuum Oil Co., Inc.

The new oils are being produced in two grades—one for high-speed operations and the other as a replacement for and possessing the same viscosity as lard oil. According to Socony-Vacuum's technical division, the service of the oils is limited for its nonstaining qualities to high-sensitive copper and copper alloys, with no claims being made as to general effectiveness in comparison with regular non-corrosive cutting oils in machining steels and other metals. Late last month, Socony-Vacuum announced the development of a new cutting-oil additive to replace sulfurized fatty materials in fluids for machining carbon and alloy steels *(The Oil and Gas Journal, May 3, page 111)*. The Cuprol oils were developed by Socony-Vacuum from a petroleum base, supplemented by an additive.

Legislation to Maintain Synthetic Plants Asked

Legislation designed to maintain synthetic-rubber production at a level which would guarantee sufficient supplies of the material in the event of another national emergency is advocated in a recommendation by John L. Collyer, president, B. F. Goodrich Co.

Collyer declared that synthetic production, without legislation, is likely to drop to 50,000 long tons a year, in view of an anticipated world rubber surplus in 1948 and the fact that manufacturers will be able to import natural rubber more cheaply than they can purchase the American-made material. Synthetic production, he said, accounted for 87 per cent of the 400,000 tons of rubber consumed during 1945, last year of the war.

The rubber-company president proposed legislation which would: maintain in a standby condition government rubber-making facilities capable, with plants of private industry, of producing 600,000 long tons annually; require private industry to use a large amount of American-made rubber to assure retention and development of technical "know-how" of production and use; provide that beyond these provisions America's long-range rubber program be based upon competitive enterprise.

Collyer suggested that tire manufacturers be required to use a minimum of 30 per cent of synthetic rubber in their products. He advocated also that the present patent and technical information exchange agreements be terminated and "research by private industry be encouraged by permitting any party to enjoy exclusively the benefits of its future research under the protection of the patent system."

Report Outlines Danger Of Ammonium Nitrate

Precautions necessary in handling ammonium nitrate are outlined in a report on the Texas City disaster issued jointly by the Fire Prevention Bureau of Texas and the National Board of Fire Underwriters.

The report indicates the material is not considered an explosive when stored in wooden containers or paper bags apart from other explosives but "may be exploded under favorable conditions by severe mechanical shock or by sufficiently heavy initiation of an intermediate explosive agent." The explosive factors of ammonium nitrate, the report says, are affected by temperatures, crystal structure, and impurities or extraneous matter.

Lubricating-Oil Output Shows April Increase

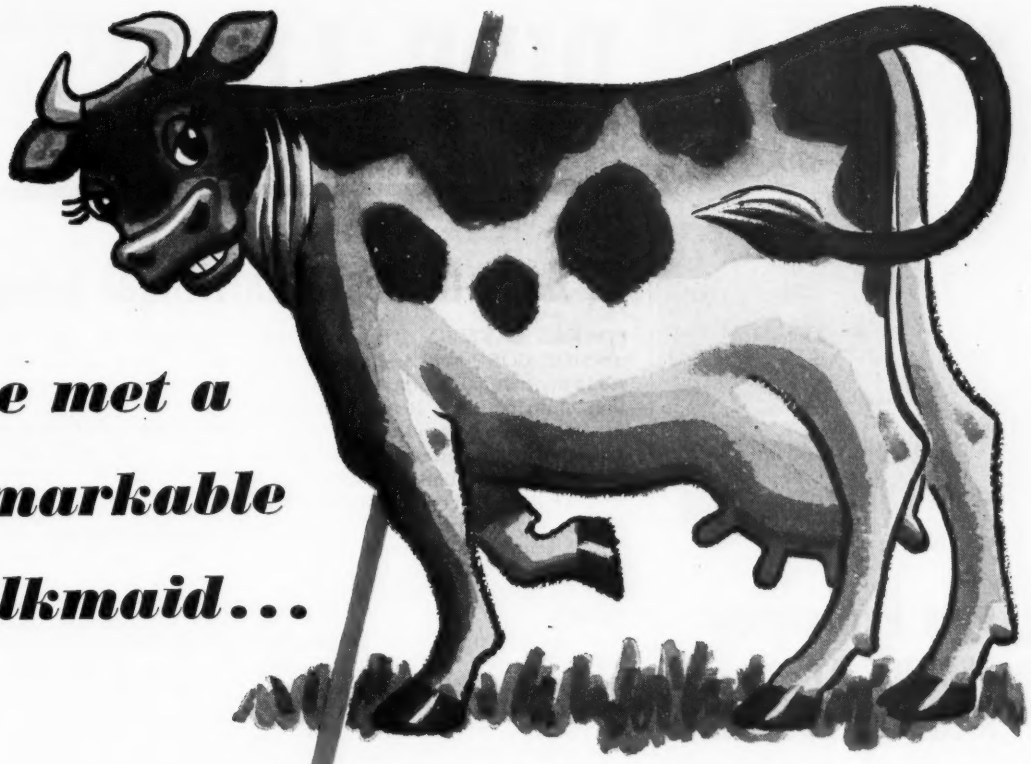
Daily average production of viscous neutrals by Mid-Continent refiners increased from 15,628 bbl. in March to 17,124 bbl. in April, while production of bright stock increased from 8,461 bbl. to 8,691 bbl. daily in the same period, according to a report by the Western Petroleum Refiners Association.

The 13 cooperating companies reported the following production gains during the period: paraffin oils, from 3,704 to 4,276 bbl. daily; steam-refined stock, 837 to 1,144 bbl. daily; and blended oils, 18,466 to 19,927 bbl. daily.

Grease-Making Pilot Plant Installed by Shell

A pilot plant for the study of methods of grease making and the development of improved products has been placed in operation in the Martinez refinery of Shell Oil Co., Inc.

The pilot plant will be used to study the value of new ingredients and to test new methods of mixing. It also will be used for experiments in the continuous production of greases.



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Not only did Perbunan solve their problem... it developed an inflation *many times better than any they had ever made before!*

Another fact worth remembering is this: Perbunan now contains a new stabilizer that makes its use possible where delicate colors are desired... without objectionable discoloration of the rubber part after exposure to sunlight or ultraviolet light, and contact with a wide variety of fluids.

If you have any rubber parts problems, our rubber technicians will gladly help you solve them. For further information, please write to the office nearest you.

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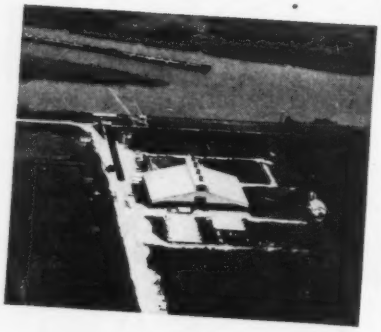

PIPE PROTECTION SERVICE AT HARVEY, LOUISIANA

Pipe Line Service Plant on Waterway Offers Additional Pipe Protection Facilities for Southern Pipe Users.

To expand its service to pipe users in the gulf coast area, Pipe Line Service Corporation's plant at Harvey, Louisiana, provides another dependable source for pipe cleaning, coating and wrapping along with storage accommodations.

Strategically located on the Intra-coastal waterway near New Orleans, the Harvey plant further provides rail, barge and truck facilities to handle all transportation requirements.

Other Pipe Line Service plants are located at Longview and Corpus Christi, Texas; Sparrows Point, Maryland; Glenwillard, Pennsylvania; and Franklin Park, Illinois. Write for new catalog describing this complete pipe protection service.

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PIPE LINES

T. E. T. to Test Centrifugal Compressors

TEXAS EASTERN TRANSMISSION CORP. will test an Ingersoll Rand centrifugal compressor at a station south of Little Rock, Ark., early in August in connection with plans to install compressors of this type at possibly four stations along the system. The company contemplates that electric motors originally installed to drive centrifugal pumps by War Emergency Pipelines, Inc., will be used for driving the centrifugal compressors.

At present the Texas Eastern organization now operating the Big Inch and Little Big Inch lines is delivering Texas and Louisiana natural gas into the Ohio River Valley in an area which does not extend further east than Pittsburgh. Without any compressors at present on the Texas Eastern system, deliveries are being made at the rate of 140,000,000 cu. ft. daily; pressures have been as high as 800 psi. Gas is being purchased from United Gas Pipe Line Co., Arkansas Natural Gas Co., Lone Star Gas Co., Hunt Oil Co. and others. Firm contracts have been made for deliveries for 340,000,000 cu. ft. daily in the Ohio River Valley in accordance with Federal Power Commission allocations.

With the contemplated installation of centrifugal compressors this year it is expected that throughput will be raised to 250,000,000 cu. ft. by the winter of 1947-48.

The possibilities of using the Texas Eastern system to transmit gas derived from plants in the Pennsylvania coal field are still in the speculative phase. Consideration is also said to be given to the exploitation of coal resources for gas production in some of the areas traversed by Texas Eastern west of Pittsburgh.

The Texas Eastern Transmission Corp. is establishing its main office in the Ward Building, Shreveport, La., which will be the headquarters of the newly elected president, R. H. Hargrove, and the newly elected vice president in charge of operations, E. R. Cunningham, both formerly with United Gas Pipe Line Co.

FPC Hearing Set July 7 On Big Inch Operation

WASHINGTON.—The Federal Power Commission has ordered a hearing opening July 7 in Washington on the application of Texas Eastern Transmission Corp. for authority to operate the Big and Little Big Inch lines for natural-gas transmission and to construct and operate additional facilities.

Texas Eastern, which is expected to acquire the lines from the Government by November 25, 1947, is operating them, in the meantime, under an interim lease from War Assets Administration and under authority of a temporary certificate from the FPC. The company has received FPC authority to install three compressor stations prior to November 1, designed to raise the delivery capacity of the lines to approximately 250,000,000 cu. ft. per day.

The proposed additional facilities include about 66 miles of lateral lines to connect the Inch lines with various gas-distributing systems in the Philadelphia and New Jersey areas and 24 compressor stations with an aggregate of 122,000 installed horsepower in addition to the 18,000 hp. provided by the three stations which are to be built by November. After completion of these facilities, the company stated, the lines would have a capacity of approximately 425,000,000 cu. ft. per day.

The total capital cost has been estimated at $182,107,000, of which $143,127,000 represents the cost of the lines and $38,980,000, the estimated cost of the new facilities.

In issuing the temporary certificate under which the lines are now being operated, FPC specified that during the interim lease Texas Eastern shall sell gas only for distribution in communities now supplied with natural gas in the Appalachian area and in the territory supplied by Panhandle Eastern Pipe Line Co. The order requires the company to make agreements assuring a fair and equitable distribution of gas delivered through the Inch lines to those areas.

Petitioners seeking to intervene in the proceedings include regulatory commissions of Arkansas, Indiana, Illinois, Michigan, Missouri, Ohio, and Pennsylvania, coal, labor, and railroad interests, the City of Toledo, Ohio, Koppers Co., Central Indiana

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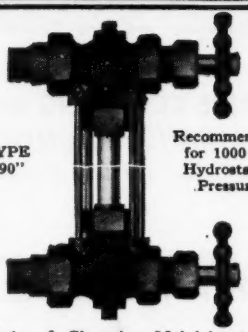

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Gas Co., Kentucky Natural Gas Corp., Illinois Power Co., Missouri Utilities Co., Northern Indiana Public Service Co., Kokomo Gas & Fuel Co., Indiana Gas & Water Co., and Tennessee Gas & Transmission Co.

Big Inch Connection Authorized by FPC

WASHINGTON. — Temporary authority has been given by the Federal Power Commission for New York State Natural Gas Corp. to construct and operate facilities to receive deliveries from the Big Inch pipe-line system.

FPC has issued the company a temporary certificate permitting construction and operation of a new 6,000-hp. compressor station and connections to cost an estimated $1,215,785 and 1.1 miles of 20-in. connecting lines to cost an estimated $98,000. These facilities will enable New York State Natural, as the capacity of the Big Inch lines is enlarged, to add up to 75,000,000 cu. ft. of gas per day to the company's present capacity.

In its application, New York State Natural described itself as party to an agreement, along with East Ohio Gas Co. and Peoples Natural Gas Co., which provides that the three companies may take an aggregate maximum of 125,000,000 cu. ft. of gas per day from Texas Eastern Transmission Co., operator of the Inch lines.

New York State Natural's projected connection with the Inch lines is in Greene County, Pennsylvania.

Ohio Oil to Continue Modernization Program

While no major pipe-line construction is planned by Ohio Oil Co. in 1947, the company will continue its program of modernizing and streamlining operations, O. F. Moore, vice president and manager of pipe lines, said, May 29, at the fifty-ninth annual stockholders' meeting in Findlay, Ohio.

During 1946 several electric, automatic gathering-line pump stations were installed in Illinois fields. These have resulted in a more efficient, flexible, and economic operation, and several more are to be constructed as soon as equipment and materials can be obtained. Ohio Oil Co. established a pipe-line aerial patrol along its eastern trunk lines the past year, which has proved to be highly efficient and economical, Moore continued.

The company will soon complete a barge terminaling facility at Wood River, Ill. The terminal located at the west end of the company's trunk-line system offers a complete common-carrier service to shippers having

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barge movements originating or terminating at Wood River.

During 1946 the company transported 121,500,000 bbl. through its crude-oil pipe-line system. This is a daily average of 333,000 bbl.

New Sarnia Line to Be Completed June 15

SARNIA, Ont.—An additional pipe line from Froomfield to Imperial Oil, Ltd.'s, refinery at Sarnia, to be completed June 15, will step up daily crude deliveries from 42,000 to 45,000 bbl.

Last fall and winter facilities of the transit and storage line in Ohio and Michigan were expanded from 30,000 to 42,000 bbl. a day. The 5 miles of 8-in. line now under construction from the gatehouse at Froomfield to the plant will give the company one 6-in. and two 8-in. lines into the refinery.

Lacy Seeks Natural-Gas Franchise in Harlingen

Rogers Lacy, independent operator, has filed an application for the natural-gas franchise for the city of Harlingen, Tex. The franchise is now held by Rio Grande Valley Gas Corp.

Pipe Line Executives Visit 30-Inch Project

In recent weeks the 214-mile, 30-in. Blythe-Santa Fe Springs, Calif., line of the Pacific Lighting Corp. group, being constructed by H. C. Price Co., has been visited by executives of Panhandle Eastern Pipe Line Co., Tennessee Gas & Transmission Co., and Cities Service Gas Co. Plans have been made for visits by executives of other companies including Natural Gas Pipeline Co. of America, Magnolia Pipe Line Co., and Southern Natural Gas Co. *(An article on the construction phases of this project appears on page 58, this issue.)*

Because of the rigidity of the high manganese 30-in. pipe used, the construction organizations for the California project have approved spanning gulleys for distances as long as 130 ft. without support. For longer spans customarily A frames or cable supports are used. Open casing is installed at road crossings without vents.

Kansas Crude Runs

Pipe-line runs of Kansas crude oil averaged 291,507 bbl. daily during the week ending May 26, registering a new high for 1947.

The runs averaged 3,598 bbl. daily above the preceding week and 11,507 bbl. daily above the May allowable of 280,000 bbl. daily.

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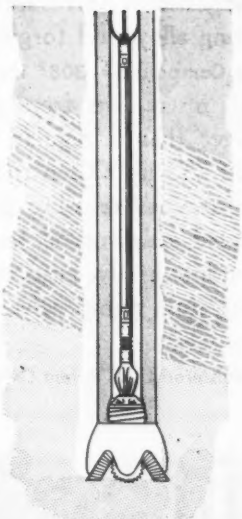

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MISSION LEADERSHIP IN
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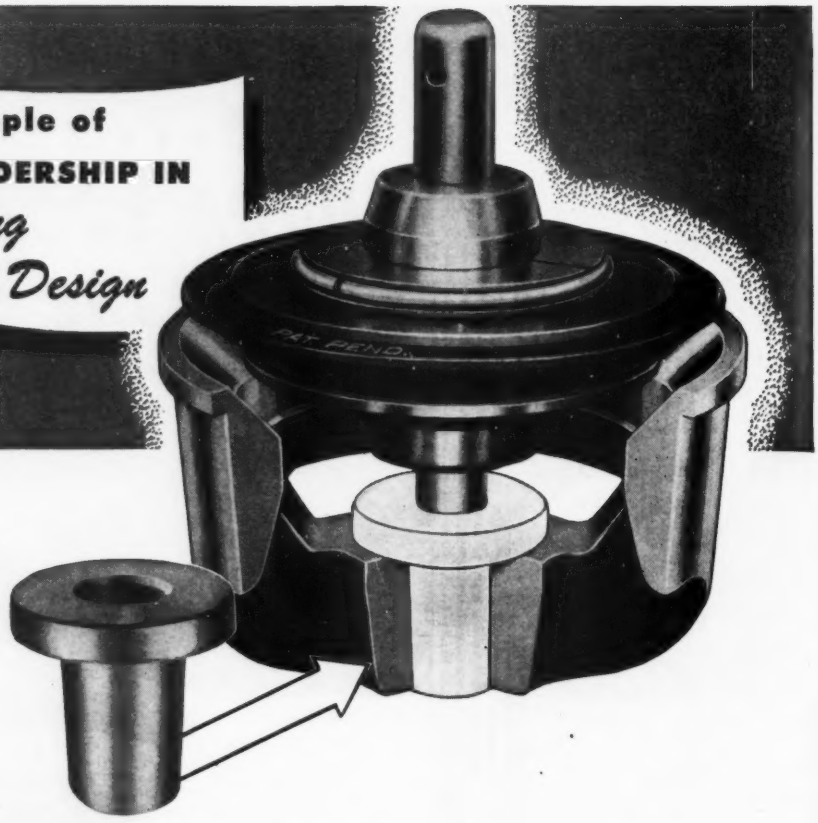

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Extra strong valve seat assures long service. The Mission valve seat is made from a strong alloy steel forging.

The Compound — 308* insert gives longer life. This insert lasts from three to five times longer than a regular insert in ordinary mud and up to ten times longer than an ordinary oil-resisting insert in hot mud, treated mud, or oil and gas. This means even lower valve costs and greater freedom from slush pump valve troubles.

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The Mission insert does not bear the weight of the valve in closing. It is held lightly in contact with the valve seat and seals positively by fluid pressure.

The extra large sealing surface means that the insert will wear longer.

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NATURAL GAS

Colorado Interstate's New Line Authorized

WASHINGTON.—The Federal Power Commission has made public an order authorizing Colorado Interstate Gas Co., Colorado Springs, Colo., to construct and operate a pipe line and compressor station and other facilities designed to increase the company's system capacity by 100,000,000 cu. ft. daily.

The proposed facilities are 240 miles of 20-in. pipe line from Lakin, Kans., to Denver; an 8,400 hp. compressor station and dehydration plant at Lakin; approximately 20 miles of 20-in. pipe line to serve as a bypass around Denver to connect the proposed line with the company's existing pipe line; 170 miles of gathering lines from 4½ to 20 in. in diameter to be used in delivering gas to the proposed compressor station.

The designed capacity of the company's system at present is 140,000,000 cu. ft. per day. The peak-day firm requirements of the company's resale and direct-sale customers for the 1947-48 winter season are estimated at 208,396,000 cu. ft., and for the 1948-49 winter season 251,398,000 cu. ft.

Issuance of the certificate for the facilities coincided with commission action granting the company's request for omission of intermediate procedure. Waiver of the procedure was allowed because no objection was made to the omission, because of the company's showing that it possessed pipe on hand to carry out the project, and because of the commission's recognition of the pressing need for the additional gas supply the project will make possible, according to an FPC announcement.

United Gas Subsidiary Formation Approved

Formation of Atlantic Gulf Gas Co. by United Gas Corp. to build and operate a $57,000,000 pipe line from Mississippi to the Atlantic seaboard has been approved by the Securities and Exchange Commission.

Newly elected officers of the company, all from United or its subsidiaries, are N. C. McGowen, president; M. A. Abernathy and G. T. Naff, vice presidents; L. V. Tracht, treasurer; A. L. McClellan, assistant treasurer; J. H. Miracle, secretary; and George D. Fiser, assistant secretary.

United filed an application with the Federal Power Commission April 14 for certificate of public convenience and necessity to construct the natural-gas line.

According to United's application, the line would originate in the vicinity of Hattiesburg, Miss., and pass through southern Alabama, northern Florida, southern Georgia, and southeastern South Carolina, terminating in the vicinity of Georgetown, S. C., and Jacksonville, Fla.

Canadian Association Holds Annual Meeting

HAMILTON, Ont. — The twenty-first annual convention of the Natural Gas and Petroleum Association of Canada, held at the Royal Connaught Hotel here recently, unanimously elected the following officers and directors:

Honorary president, Major E. Sweet, Brantford, Ont.; president, S. A. Morse, Union Gas Co., Chatham, Ont.; first vice president, S. B. Severson, Dominion Natural Gas Co., Buffalo, N. Y.; second vice president, C. N. Glenny, Provincial Natural Gas Co., Fort Erie, Ont.; treasurer, J. A. Richie, Dominion Natural Gas Co., Buffalo, N. Y.; secretary, Joseph McKee, United Gas & Fuel Co., Hamilton, Ont.; directors, J. B. McNary, Hamilton; J. A. McNevin, K. C. and T. Weir, Chatham; George H. Smith, Port Colborne, Ont.; G. D. Wickett, Windsor, Ont.

Construction problems encountered in bringing Texas gas into Canada were discussed at the meeting by W. L. Dutton, of Union Gas Co. of Canada, Ltd., who has been engineer in charge of the pipe-line project which involved the laying of a dual transmission line under the Detroit River, tunneling for pipe lines under 27 tracks on the Canadian side, and other projects, still uncompleted, including a 63-mile transmission line from Windsor to deliver gas to storage wells in Dawn field.

Utilization of available natural-gas supplies to the best advantage was the dominant note of another session presided over by Vice President S. B. Severson. Topics included the best method of protecting domestic regulators on high-pressure lines from freezing, the cause and correction of internal corrosion on high and intermediate-pressure lines, and practical and economical methods of cleansing gas sands in small producing wells.

First Quarter Gas Sales Increase 14.3 Per Cent

A 14.3 per cent increase in sales of natural gas during the first quarter of 1947 is reported by the American Gas Association. Sales increased from 637,500,000 to 728,400,000 M.c.f.

Commercial gas sales rose 24.2 per cent, and residential and industrial gas sales gained 18.7 per cent and 15 per cent respectively, over the same quarter of 1946.

Total revenues from sales of natural gas in the quarter amounted to $270,600,000, a gain of 18 per cent over the same quarter of 1946. Natural-gas consumers numbered about 9,700,000, up some 18 per cent. For the 12 months ending March 31, total natural-gas revenues were $683,600,000, up 9.7 per cent, and sales totaled 2,273,100,000 M.c.f., an increase of 6.6 per cent, the association reported.

German Carbon-Black Techniques Described

German techniques for manufacturing carbon and lamp blacks from enriched gases, anthracene oil, naphthaline, and acetylene are described in a report being published by the Office of Technical Services of the Department of Commerce.

The report, prepared by British intelligence officers, contains an evaluation of German blacks as compared with continental and United States products.

Natural Gasoline

Magnolia Sells Sunray Plant to Shamrock

Purchase of the Magnolia Petroleum Co.'s Sunray gasoline plant has been announced by J. H. Dunn, president of Shamrock Oil & Gas Corp.

The plant, located 3 miles south of Sunray, Tex., was built in 1937 and has been operated by Magnolia since that time to process its natural-gas production in the area. Under the purchase arrangements, Magnolia will continue operation of the plant with its employes for the present. However, Shamrock will install additional facilities to substantially increase the capacity of the plant, plans for which are now being completed with work expected to start immediately, Dunn said. Approximate capacity of the plant at present is 22,000 gal. daily.

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Exploration and Drilling

Canada's Leduc Field Looks Good

IN the early stages of completion, the third well in the Leduc field, some 20 miles south of Edmonton, Alberta, Canada, prior to acidization, gives every indication it may be as good as its predecessors. The Imperial Leduc 3, LSD 10, 26-50-26w4, lies 1¼ miles north and 1½ miles east of the discovery well of last February. *(See The Oil and Gas Journal, February 22, 1947, page 191).*

The discovery well, Imperial 1 Leduc, is in LSD 5, 22-50-26w4, while the second completion, Imperial 2 Leduc, is in LSD 1, 16-50-26w4. Thus the three completions to date stretch over an area 2½ miles north and south by 1¾ miles east and west. The fourth test, Imperial Leduc 4, expected in momentarily, is in LSD 16, 15-50-26w4, only ¾ mile east and ¼ mile south of the discovery well.

Producing 39°-gravity oil from a Devonian lime pay at around 5,000-5,400 ft., and wells with an open-flow capacity of probably around 1,000 bbl. daily, the success at Leduc has given Canada's oil exploration play a decided impetus.

Already it has been announced that if arrangements can be made with other participants, Shell Oil Co. of Canada will deepen and test the Devonian in one of its existing wells on the Jumping Pound structure, where the Madison lime distillate production to date at 10,000-11,000-ft. depths has not been too encouraging considering the cost of the wells. *(See The Oil and Gas Journal, November 10, 1945, page 127).* Jumping Pound is in the foothills belt, whereas Leduc is in the northern plains area. However, Devonian might be expected at around 12,000 ft. at Jumping Pound.

Within a 50-mile region around Leduc, wildcatting is stepping up rapidly. Imperial Oil Co. alone plans to keep four drilling rigs busy on wildcats, in addition to four rigs on development work in the field proper. McColl-Frontenac Oil Co. has started three rigs testing structures south of Leduc, and at least three rigs will be running for independents around the Leduc field.

Leduc is the first important discovery in the Alberta syncline which flanks the Rocky Mountains. It is also the first area in the northern plains where the Devonian has been tested. The nearest Devonian production is found in the Steveville-Princess area, some 200 miles to the southeast, at much shallower depths.

Present indications are that there are at least two porous zones in the Devonian at Leduc, with the discovery well producing from the shallower of the two, and Nos. 2 and 3 from the second zone.

MICHIGAN

Five More Wells Completed In Garfield Township Field

SAGINAW.—The Sun Oil Co.-developed Garfield Township field in Newaygo County has assumed considerable importance through latest completions. Five listed for the past week in the 6-month-old discovery area flowed naturally for a combined initial potential of 1,440 bbl., two rating 500 bbl., two flowing 100 bbl. pinched, and another gaged at 240 bbl.

The week's oil and gas operations in the state resulted in 23 completions for 10 oil wells, three gas wells and 10 dry holes, five of the failures being wildcats. Meanwhile, the State Conservation Department granted 24 permits for wells in new locations.

The five other oil wells reported for the week included a 700-bbl. producer in Monterey and a 220-bbl. well in Heath, both Allegan County.

Oil men also attached significance to Carter Oil Co. 1 Eilers in the recently discovered Claybanks pool, Oceana County. The new well flowed 249 bbl. on an 18-hour test. The other producers were a 106-bbl. well, in Coldwater, Isabella, and a 25-bbl. well, thirty-sixth on the Sun Oil Horner lease in Norwich, Missaukee. The three gas wells combined for nearly 24,000,000 cu. ft. are in Clare County.

Of the wildcats, chief interest was in Chase Township, Lake County, where B. F. Austin & Co., Inc., got an oil show at 2,444 ft. in 1 Sanford. Acidizing got no results, however, and the test was abandoned.

The over-all state production picture showed its customary slight decline, Michigan Oil & Gas Association statistics giving daily average production as 42,333 bbl. from 3,512 wells.

MICHIGAN WILDCAT FAILURES

Allegan County, Allegan Township: Stanley L. Findley 1 C. B. and F. I. Stegeman, SE SW SW 32-2n-13w, dry in Traverse limestone, TD 1,405 ft.

Fillmore Township: Ford Oil Co. 1 Jon DenBleyker, NE SE NE 20-4n-15w, dry in Traverse limestone, TD 1,462 ft.

Monterey Township: W. Spencer Cook 1 William Teed, SE SE NE 2-3n-13w, dry in Traverse limestone, TD 1,689 ft.

Kalamazoo County, Oshtemo Township: Lloyd C. Green 1 Reuben Sonnevil, NW NE SW 10-2s-12w, dry in Traverse limestone, TD 1,490 ft.

Lake County, Chase Township: B. F. Austin & Co., Inc., 1 Stanley Sanford, SE SE SE 19-17n-11w, acidized for oil show with no results, TD 2,461 ft., plugged back to 2,444 ft.

APPALACHIAN FIELD

Peoples Natural Plans Three Deep Gas Tests

PITTSBURGH.—Searching for additional gas reserves, Peoples Natural Gas Co. has made three locations for deep tests in southwest Pennsylvania and east of structures on which tests have already been drilled. In Somerset County, this company will test the Negro Mountain anticline with their location on the R. F. Grove farm which on the Wimber Quad is located 1.05 miles east of 78° 55′, and 0.1 mile north of 40° 0.05′. Surface elevation is 2,343 ft.

North in Cambria County and in Cambria Township, this company has a location on the G. W. Bumford farm on the Ebensburg anticline which on the Johnson Quad is located 0.26 mile west of 78° 45′ and 0.85 mile north of 40° 25′. It starts at a surface elevation of 2,183 ft. On the Ebensburg Quad, the third test is located on the W. A. Krempasky farm, elevation 1,878 ft., and located 1.7 miles east of 78° 45′ and 1.3 miles north of 40° 25′. These will be most important tests as the area is untested and as they are located on major structures.

In Sugar Grove Township, Warren County, the test of Pettigrew et al, on the Anderson farm was bottomed at 4,369 ft. and was dry. The Tully lime was logged at 2,833-59 ft., Onondaga 3,046-3,183 ft., Oriskany 3,183-3,216 ft., Red Medina with gas and show of oil 4,222 ft., White Medina 4,295 ft.

In Green Township, Erie County, Appalachian Development Corp. topped the Tully lime at 2,070 ft. in the wildcat on the E. M. Downing farm and the Onondaga at 2,301 ft. It is drilling at 2,417 ft.

New locations totaled eight and were in Plum Creek, Red Bank, South Bend townships, Armstrong County; Washington Township, Indiana County; Clover Township, Jefferson County; Fallowfield and South Franklin townships, Washington County.

In Ripley district, Jackson County, Godfrey L. Cabot, Inc. completed a test, 1,234 T. D. Castro, with a final open flow of 2,239,000 cu. ft. with a surface elevation of 682 ft., Corniferous lime 4,830 ft., Oriskany 4,915-4,944 ft., gas 4,925-26 ft., shot 4,923-46 ft., rock pressure 1,695 lb. 22½ hours, total depth 4,946 ft.

In Booths Creek district, Taylor County, Hope Natural Gas Co. completed a good Fifty Foot sand gas well in 9,129 M. O. Goff which gaged 1,090,000 cu. ft. from a total depth of 1,636 ft.

New locations in West Virginia totaled

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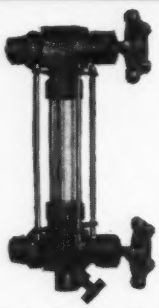

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42 and were in Crook and Washington districts, Boone County; Otter district, Braxton County; Cross Creek Township, Brooke County; Washington district, Calhoun County; Troy district, Gilmer County; Ravenswood, Ripley, and Washington districts, Jackson County; Poca district, Kanawha County; Harts Creek, Jefferson and Laurel Hill districts, Lincoln County; Liberty district, Marshall County; Jefferson Union districts, Pleasants County; Curry and Teays Valley districts, Putnam County; Clear Fork and Marsh Fork districts, Raleign County; Clay, Grant, Murphy and Union districts, Ritchie County; Harper district, Roane County; Booths Creek district, Taylor County; Banks district, Upshur County; Lincoln and Union districts, Wayne County; Grant district, Wetzel County; Burning Springs district, Wirt County; Union district, Wood County; Baileysville, Ruff Creek, and Oceana districts, Wyoming County.

TEXAS GULF COAST

New Oil Field Indicated by American Republics Test

HOUSTON.—A new oil field for Tyler County was indicated when a drill-stem operation in American Republics Corp. et al, wildcat test 5 miles west-southwest of Fred field, showed oil on recoveries. The test is in the Sarah Fields Survey. The test was made at 9,066-80 ft. using ¼-in. chokes top and bottom. It flowed the water cushion and started flowing 42°-gravity oil when tester was being pulled. After test was completed, 23 stands of 42°-gravity oil was accounted for. Hole was being drilled ahead with a projected depth of 10,750 ft.

Two miles north of Halletsville in Lavaca County, Forest Oil Corp. 1 H. C. Obelgoner, 17 miles northeast of Yoakum field, was drilling ahead after a drill-stem test at 7,383-93 ft. recovered 1,000 ft. of water cushion, 45 ft. of oil, and 360 ft. of salt water with 7½-lb. working pressure, a bottom-hole flowing pressure of 800 lb. and shut-in bottom-hole pressure 2,300 lb. It is projected to the 9,000-ft. level.

Phillips Petroleum Co. extended deep high-gravity oil and gas production 3,000 ft. to the southeast at Chocolate Bayou in Brazoria County with Cosby No. 1 in HT&B Survey, Section 2. The well flowed 3,870,000 cu. ft. of gas and 176 bbl. of 43.7°-gravity oil daily through a 10/64-in. choke. Flowing pressure on the tubing was 5,035 lb., and gas-condensate ratio was 21,989-1. Open-flow calculation was 85,000,000 cu. ft. of gas daily. Production was from perforations at 10,760-80 ft. Total depth was 11,325 ft.

New deep-oil production was found by Sun Oil Co. off the northwest flank of the Orange dome in Orange County. The well, 2 Lutcher-Moore Lumber Co., James Dyson Survey, perforated pipe with 47 shots from 7,589-7,601 ft., and the well flowed oil and gas while cleaning into burning pits through a 10/64-in. choke. Flowing pressure on the tubing was 900 lb. Flow died at the end of 7 hours, but was revived when swab was run. Hole was drilled to a total depth of 9,005 ft., and 7-in. pipe is cemented at 8,638 ft.

New tests made in Sun Oil Co.'s South Call field discovery, Newton County, 1 White & West, have failed to show commercially. A test made through 60 perforations at 10,280-95 ft. failed to flow after swabbing for several days, showing only small amounts of oil, gas, and water during the operation.

Magnolia Petroleum Co. failed in attempts to extend Chesterville field 1¼ miles south. Failure was announced for the 1-A Linderholm, Edwards one-third League, at a total depth of 9,863 ft. A drill-stem test of 120 perforations at 9,653-73 ft. failed to make a recovery and failed to flow when being swabbed. An initial test from peforations at 9,640-53 ft. showed salt water and gas, while another test from 9,656-9,716 ft. flowed gas and salt water.

Fourteen new wildcat explorations were announced for the Texas Gulf Coast district, greatest exploration interest being shown in Calhoun, Chambers, and Goliad counties, each receiving two new explorations. Twenty-one new tests were scheduled for operations in proved areas.

Successful wildcat operations included a new oil field for Matagorda County, and a new gas-condensate pay horizon for Heyser field in Victoria County. Five wildcat failures were reported, one each for Chambers, Harris, Live Oak, Orange, and Wharton counties.

TEXAS GULF COAST SUCCESSFUL WILDCATS

Matagorda County: New oil field, South Lucky—Stanolind Oil & Gas 1 Marcus D. Huebner, 2 mi. S Lucky field, Peter Bertrand Sur., TD 12,776 ft., top pay 9,236 ft., perf. 9,236-38 ft., IP 79.34 bbl. 34°-gravity oil per day, ⅛-in. choke, TP 890 lb., 0.1 per cent water.

Victoria County: New gas-condensate pay, Heyser—Barnsdall Oil Co. 8 W. H. Bennett, J. S. Galban Sur., TD 8,010 ft., top pay 7,480 ft., perf. 7,481-93 ft., flowed gas and condensate through ⅛-in choke with 2,700-lb. pressure on drill-stem test, shut in after running tubing, no gage taken.

TEXAS GULF COAST WILDCAT FAILURES

Chambers County: Gulf Oil Corp. 3 W. F. Mayes et al, 9,200 ft. N Lost Lake field, V. Blanchet Sur., dry, TD 8,966 ft.

Harris County: Union Producing Co. 1 J. W. Rath, 2 mi. NE North Aldine gas field, S. W. Upshaw Sur., Blk. 35, Geo. W. Harbin Subd., dry, TD 8,500 ft.

Live Oak County: Henshaw Bros. & E. H. Smith 1 B. A. Wales, 3½ miles NE Mt.

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Lucas field, AB&N Sur. 271, DST 4,434-40 ft., developed 180-lb. working pressure and recovered 899 ft. salt water, abandoned, TD 4,440 ft.

Orange County: Lloyd H. Smith et al 1 W. C. Gilbert & L. L. Williams et al, 2 mi. NE Vidor, C. W. Theriot Sur., Sec. 38, dry, TD 8,508 ft.

Wharton County: Grubb & Hawkins 2 Rudolph C. Peters, L. Conkrite Sur., 1,000 ft. west No. 1 Peters, Gobbler Creek discovery, dry, TD 5,802 ft.

N. CENTRAL TEXAS

Jack County Well Gets Conglomerate Pay

WICHITA FALLS.—New Bend conglomerate pay for the Lester Mississippi limestone field of western Jack County was opened last week at S. D. Johnson and Acme Die & Machine Co. 1 G. A. Johnson. The well topped pay in the conglomerate at 4,966 ft., drilled out to 4,977 ft., when it flowed for 8 hours through 9/64-in. tubing choke before being shut in for storage. Amount of the flow was not gaged, and production tests will be delayed until tankage is erected.

A second producer was completed in the new Lewis-Stuart Caddo limestone field of southern Montague County. Continental Oil Co. 1 Davidson, in the N. S. Ussery Survey, perforated at 6,215-27 ft. and flowed 97 bbl. of oil the last 3 of a 6-hour test, to make a daily potential of 784 bbl. of oil.

A new shallow field for Brown County was reported at O. R. Bollinger and R. A. Bonner 1 Guy Grady, in the William English Survey, 6 miles southwest of Rising Star. The well pumped 12½ bbl. of 42°-gravity oil in 24 hours from an unnamed pay zone at 1,165-74 ft., total depth.

New exploration tests staked, or planned, during the week included a 5,100-ft. wildcat for northwest Archer County, 2 miles northeast of the Lake Kickapoo spillway. It is Stewart & Grisham, of Houston, 1-A John F. Donohoe, and is 5 miles southeast of nearest production on the T. B. Wilson Ranch, owned by British American Oil Producing Co. Two wildcats are said to have been drilled in the area, one to 3,500 ft. and the other to 4,000 ft. In Young County, Fain & McGaha, Wichita Falls, staked their 1 J. W. Jack, ¾ mile north of Markley, for a 4,500-ft. test. Location is 1 mile south of a dry hole drilled by the same operators. Nine miles northeast of Foard City, Foard County, Magnolia Petroleum Co. 1 A. G. Bell spudded in and set surface casing. Continental Oil Co. announced location for another stratigraphic test in Clay County, some 3 miles northeast of the town of Prospect. It will be 1 Ina Black.

NORTH CENTRAL TEXAS WILDCAT FAILURE

Montague County: Lesh & McCall 1 T. M. King, Mary Burnsides Sur., A-14, 10 mi. NE Nocona, dry, TD 2,632 ft. in sandy shale and sand.

WEST CENTRAL TEXAS WILDCAT FAILURES

Brown County: Lone Star Producing Co. 1 J. Shannon, Ignatius Rossean Sur. 14, 3 mi. E Brownwood, dry, TD 1,841 ft., Marble Falls 1,562 ft., Barnett shale 1,704 ft., Ellenburger 1,788 ft., elev. 1,364 ft.

Williams & Carter 1 Frank Woods, Blk. 4, Fourney Hunt Sur., 6 mi. NW Brownwood, dry, TD 2,652 ft., Caddo 1,506 ft., Ellenburger 2,323 ft., sulfur water 2,640 ft.

Callahan County: Capital Co. 1 Tom Windham, G. W. Denton Sur. 371, 5 mi. NE Oplin, dry, TD 4,503 ft., Palo Pinto 2,681 ft., Gardner sand 3,261 ft.

Haskell County: Anderson-Prichard Oil Corp. 1 T. D. Stamps, D. J. Woodlief Sur. 122, 3½ mi. SW Weinert, dry, TD 5,000 ft., no tops available.

Palo Pinto County: Ernest Lloyd 1-X Pat Dalton, C. A. Dalton Sur., A-1,555, 6 mi. W Graford, dry, TD 1,645 ft., sand with estimated 500,000 cu. ft. gas, 1,180-90 ft.

Parker County: Grade Oil Co. 1 O. V. Sneed, Sec. 321, T&P Sur., ¼ mi. SW Garner, dry, TD 5,415 ft., Marble Falls 4,160 ft., Barnett shale 5,280 ft., elev. 942 ft.

Shackelford County: Bahan Bros. 1 L. B. Gray, Blk. 83, University Lands, 1½ mi. S Moran, dry, TD 4,120 ft., Caddo 3,356 ft., show free oil 3,375-82 ft. and 3,400-06 ft.

W. D. Baker 1 W. D. Baker, Sec. 210, Blk. 10, ETRR Sur., 4 mi. SE Lueders, dry, TD 1,702 ft., Bluff Creek 1,619 ft., sand with show oil 1,619-24 ft.

Throckmorton County: Mayflower Properties, Inc. 2 J. J. Keeter, Sec. 3,034, TE&L Sur., 6½ mi. NE Throckmorton, dry, TD 4,897 ft., Caddo 4,339 ft., Chester 4,865 ft.

SOUTH LOUISIANA

Potential Awaited on Sohio, Union Sulphur Discovery

NEW ORLEANS.—Sohio Petroleum Co. and Union Sulphur Co. were awaiting potential flow from their joint discovery on the Scott-Duson prospect, Lafayette Parish. The new producer, 1 Harson Unit "A," Section 5-10s-3w, 11 miles east and a short distance north of Crowley field in Acadia Parish, made an initial gage of 18 bbl. of condensate and 1,750,000 cu. ft. of gas daily through a 10/64-in. choke. Flowing pressure on the tubing was 3,250 lb. After showing 100 per cent salt water through perforations at 10,750-52 ft., bridge plug was drilled out, and the well completed in perforations at 10,840-56 ft. where a previous drill-stem test indicated gas and condensate production. Total depth was 12,067 ft.

Crosby Drilling Corp. is attempting to complete a semiwildcat exploration on the south flank of the Napoleonville dome in Assumption Parish, Section 4-12s-13e. It is 1 Clifton Land Corp. et al, bottomed at 5,413 ft., and testing through perforations shot at 5,268-72 ft., after conducting squeeze jobs at 5,363-72 ft. and 5,218-24 ft.

Production liner was set in Stanolind Oil & Gas Co.'s rank wildcat in the East Florence area of Vermilion Parish. The 1 E. M. Watkins, Section 23-13s-1w, 6 miles east of Florence townsite, was drilled to a total depth of 10,991 ft. in the sidetracked hole, and 5-in. liner cemented 1 ft. off bottom. The well has been drilled tight, but is reported to have several sands likely to produce. First hole was lost at 11,115 ft. when it drilled into a strong gas and salt-water flow and blew out of control sticking drill pipe on the bottom.

Several deep wildcat failures marked exploratory notes this week. In Avoyelles Parish, Lyle Cummings 1 Bordelon Unit, Pomme de Terre prospect, SW NE 9-1n-6e, topped Cockfield 4,660 ft., Cook Mountain 4,840 ft., Sparta 5,230 ft., Wilcox 6,510 ft. with first Wilcox sand at 6,540 ft., and no shows to a total depth of 7,515 ft.

On the south side of Weeks Island Dome, Iberia Parish, deepest oil-producing area in the world, Humble Oil & Refining Co. announced abandonment of 2-B Burguieres Co., Ltd., at a depth of 12,644 ft., and no favorable shows. It was 700 ft. south of No. 1 junked hole and in Section 44-14s-7e.

Two miles southeast of production in Bayou Boullion field, Iberville Parish, Gulf Refining Co. 1-A A. M. Cotton et al, Section 49-9s-9e, was plugged and abandoned after unsuccessfully testing through perforations at 10,332-54 ft., 10,374-86 ft., and 9,712-20 ft. Total depth was 11,876 ft.

Humble Oil & Refining Co. reported a potential gage from a new pay discovery at Avery Island in Iberia Parish. No. 13-B Petit Anse Co., 23-13s-5e, flowed 324 bbl.

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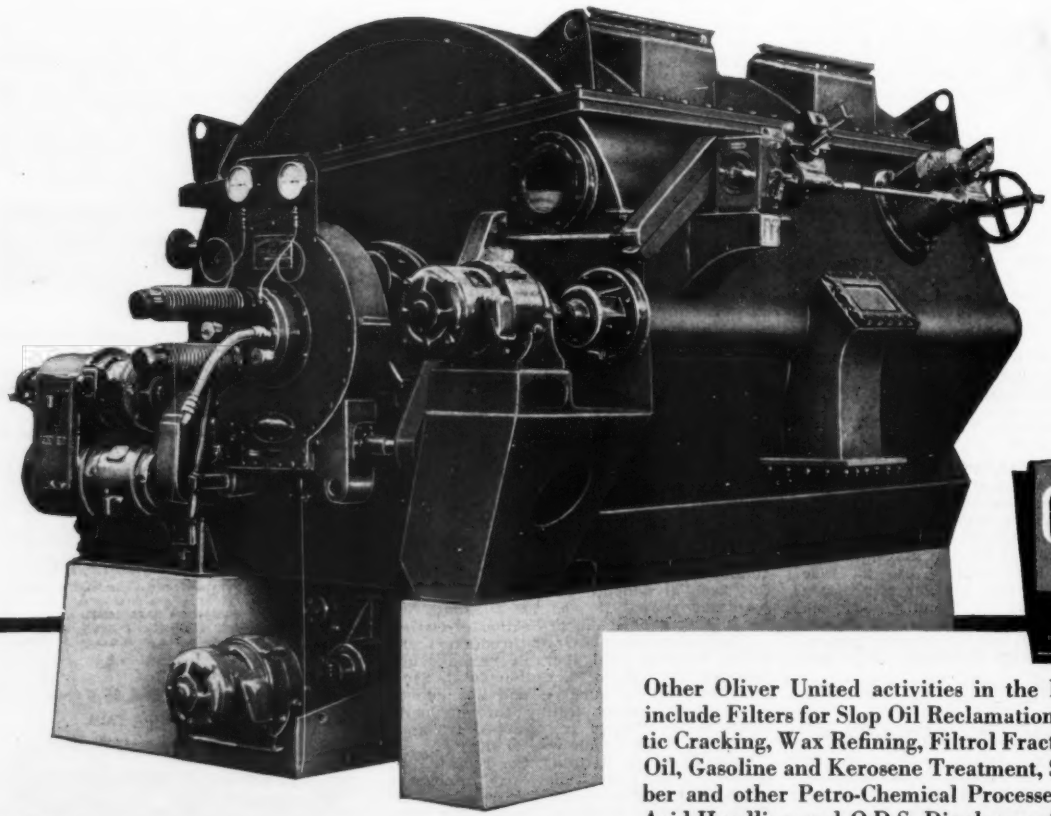

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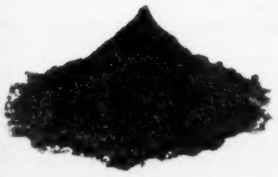

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35°-gravity pipe-line oil daily through a ⅛-in. choke from 200 perforations 10,310-60 ft. Total depth was 10,795 ft.

Union Producing Co. gaged 1 Laterre Co., Inc., 5,300-ft. eastward extension and new-sand discovery at Lirette field in Terrebonne Parish. Total depth was 11,600 ft., and production was through 40 perforations at 10,470-80 ft. It gaged 8 bbl. condensate, 50.9° gravity, daily along with 550,000 cu. ft. of gas daily through a ½-in. choke on the regulator. Flowing pressure on the tubing was 3,625 lb.

There were two successful wildcat explorations reported this week, a new oil pay at Avery Island field in Iberia Parish, and a new gas pay and 5,300-ft. extension to Lirette production in Terrebonne Parish, with a dry hole reported on the Pomme de Terre prospect in Avoyalles Parish. New oil production from proven areas totaled six, with one dry hole, West White Lake field, Vermilion Parish.

There were four new wildcat locations, one each in Acadia, Beauregard, St. Charles, and St. Landry Parish, while proved territory received a total of nine locations, one each in Iberville, Jeff Davis, and Terrebonne Parish, and three each for fields in Plaquemines and St. Mary parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Iberia Parish: New oil sand, Avery Island field—Humble Oil & Refining Co. 13-B Petit Anse Co., 23-13s-5e, TD 10,795 ft., top pay 10,310 ft., perf. 10,310-60 ft., IP 324 bbl. 35°-gravity oil per day, ⅛-in. choke, TP 2,150 lb., no water.

Terrebonne Parish: New gas sand, Lirette field—Union Producing Co. 1 Laterre Co., Inc., 35-19s-19e, extends gas production 5,300 ft. eastward. TD 11,600 ft., top pay 10,470 ft., prod. 10,470-480 ft., IP 8 bbl. 50.9°-gravity condensate per day and 217,000 cu. ft. gas per day, ⅛-in. choke, TP 3,625 lb., no water.

SOUTH LOUISIANA UNSUCCESSFUL WILDCAT

Avoyelles Parish: Lyle Cummins 1 Bordelon unit, Pomme De Terre prospect, 23 mi. NE Eola field, 3 mi. SE of Bordelon townsite, 9-1n-6e, T-Cockfield 4,660 ft., Sparta 5,230 ft., Wilcox 6,510 ft., TD 7,515 ft., dry.

EASTERN TEXAS

Extension Indicated for Shelby County Gas Field

DALLAS.—An extension for Joaquin field of northeastern Shelby County, was in prospect last week at Natural Gas Distributing Co. 1 Bertha & John Brantley. A drill-stem test from open hole at 6,570-6,615 ft., total depth, produced a slight blow but had no pressure. Operators set bridge plug at 6,150 ft., perforated 5,997-6,0001 ft., and 6,022-32 ft., ran tubing, and acidized the lower Pettit. On last report a test had not been made, but it was estimated good for 20,000,000 cu. ft. of gas a day. Top of the lower Pettit was 5,999 ft., on an elevation of 195 ft.

J. L. Collins Co. et al 1 Lilly Barnett, 2 miles southwest of Bazette in Navarro County, reported shows of oil sand in samples. A drilling break in limestone at 5,144-46 ft. showed oil stain and a 30-minute drill-stem test of the Glen Rose, with packer set at 5,135 ft., recovered 40 ft. of oil-cut sand. Total depth was 5,152 ft., and operators prepared to drill ahead.

Magnolia Petroleum's Houston County wildcat, 6 miles southeast of Grapeland, was still showing for a possible discovery. Total depth was 10,436 ft., with tests being made in the Glen Rose at 8,395-8,435 ft. Operators swabbed the well dry, then filled the tubing with water but were unable to break circulation under 2,000-lb. pressure, due to the testing tool being plugged. Open tubing was rerun to 8,430 ft., the well washed for 15 minutes, when it started kicking, then flowed small heads of mud with some oil and gas.

The Texas Co. 1 W. M. White, deep test in Fairfield gas field, Freestone County, had total depth at 14,331 ft., plugged back to 7,980 ft. Perforations were made in the Pettit at 7,850-70 ft., and a test of that interval produced a blow of gas and recovered 21 stands of drilling mud. Another test at 7,850-70 ft., open 1 hour, produced an instant blow of gas but small pressure. It was swabbed once to 7,300 ft. and recovered a small amount of mud, when the packer again failed. Another test at the same depth produced a small flow of gas during the first hour, plus some drilling mud. Operators will plug back to test the Woodbine.

SOUTHWEST TEXAS

Gas Condensate Pool Opened by Lacy Well

CORPUS CHRISTI.—A new gas and condensate pool was opened on the western edge of Cameron County, about 1½ miles southeast of the discovery well in Lacy field of Hidalgo County. Ann Lacy and Patsy Lacy 4 Roger Lacy fee flowed gas and condensate on a large choke with 2,500-lb. working pressure from perforations at 7,520-32 ft. It was estimated good for 20,000,000 cu. ft. of gas per day and an unestimated amount of condensate per day on open flow. Shut-in pressure is 4,000 lb. Total depth is 8,300 ft. The new discovery is located in Block 2,524 of Section 9, North Capisallo district in La Feria Grant.

Cam Corp. 1 John Allen, new gas-field discovery in Jim Hogg County, 3½ miles east of Randado and 18 miles southwest of Hebbronville, flowed 1,100,000 cu. ft. of gas per day on a ¼-in. choke with a small amount of condensate. Flowing pressure on the tubing was 800 lb., and shut-in pressure was 1,033 lb. Total depth is 3,545 ft., and pipe is perforated with 24 shots from 2,932-37 ft. for completion. A previous test made from perforations at 3,501-06 ft. showed salt water.

New gas production was indicated west of West Cole gas field in southeastern Webb County. John F. Camp & Sons 1 Rose V. de Benavides, in the northeast quarter of Survey 701, made a drill-stem test in Pettus sands at 2,532-42 ft. and developed 360-lb. working pressure in 10 minutes, recovering 20 ft. of gas-cut mud after flowing gas through the drill stem using ¼ and ⅜-in. chokes. Hole has a total depth of 2,938 ft., and 5½-in. pipe is cemented to 2,590 ft. Perforations are being made to complete the well.

North of Ross field in southeastern Starr County, Ernest S. Adams, Houston, reported abandonment of his 1 M. M. Garcia after making a drill-stem test at 2,660-70 ft. Tool was open 25 minutes and recovered 20 ft. of oil-cut mud with no pressure. Total depth was 2,730 ft., and after showing noncommercially on a production test, it was abandoned as a dry hole. Drill site is on a 154-acre lease in Survey 956.

There was a total of 28 new tests located in the Southwest Texas district, 18 of which were in proven territories and 10 wildcat explorations, 1 each for Bexar, Duval, Kimble, McMullen, San Patricio, Starr, Travis, and Zapata, with two for Guadalupe County.

Official completions were recorded for two successful wildcats. A new gas field for Jim Hogg County, 3½ miles east of Randado, and a new oil pay horizon in Agua Dulce field of Nueces County. Eight wildcat failures were reported, one each for Bastrop, Cameron, Jim Wells, Kleberg, McMullen, Nueces, Starr, and Willacy counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Jim Hogg County: New gas-field discovery —Cam Corp. 1 John Allen, H&GN Sur. 29, 3½ mi. E Randado, top pay 2,932 ft., TD 3,545 ft., perf. 2,932-37 ft., IP 2,900,000 cu. ft. gas per day open flow, 1,100,000 cu. ft. gas per day, ¼-in. choke, TP 800 lb., SIP 1,033 lb., no water.

Nueces County: New oil pay, Agua Dulce field—Puenticitas Oil Co. 1 M. G. Perry, Partn. of Wright Lands, V. L. de Herrera Grant, top pay 6,812 ft., TD 6,824 ft., perf. 6,821-23 ft., IP 27.48 bbl. oil per day, 3/32-in. choke, TP 2,015 lb., CP 2,625 lb., 43° gravity, no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Bastrop County: General Crude Oil Co. 1 B. S. Moncure, 8 mi. SW Bastrop, L. Leverence & Chas. S. Smith Sur., dry, TD 3,481 ft.

Cameron County: Goldrus Drilling Co. & Geo. Echols 1-A Al & Lloyd Parker, 2½ mi. SE Harlingen, Blk. 177, San Benita Land & Water Co. Subd. Concepcion de Carricitos Grant, dry, TD 10,007 ft.

Jim Wells County: Radcliffe Killam 1 Wade, 4 miles NW Sandia, Blk. 7, J. E. Walsh Subd. of Wade Ranch, dry, TD 5,200 ft.

Kleberg County: Southern Minerals Corp. 1 T. M. Brookshire, 15 mi. SE Kingsville, Sec. 68 King 4th. Subd. of Riviera Lands, Blk. 6, dry, TD 8,023 ft.

McMullen County: Chas. H. Burns 1 A. G. Dolph, 4 mi. SW of Ezzell field, Sec. 5, Shumway Subd. of Shiner Ranch in Wm. McGill Sur., dry, TD 1,535 ft.

Nueces County: Republic Nat. Gas Co. 1 Clara Driscoll estate, 1½ mi. N Driscoll, just S of Gandy area production, Jose A. Cobozos Sur., Tract 1, dry, TD 6,011 ft.

Starr County: Ernest S. Adams 1 M. M. Garcia, NE Ross field, Sur. 956, DST 2,660-70 ft., recovered 20 ft. oil-cut mud, abandoned, TD 2,730 ft.

Willacy County: Magnolia Pet. Co. 3 F. Armendaiz, 4,174 ft. SE Paso Real discovery well, Big Share 4, San Juan de Carricitos Grant, dry, TD 11,000 ft.

PERMIAN BASIN

Humble Southwestern Ector County Test Showing Oil

MIDLAND.—Activity in West Texas fields was on the increase last week, with a number of exploratory tests and extension wells showing for production. In southwestern Ector County, Humble Oil & Refining Co.'s scheduled Ellenburger test was showing oil in what was thought to be the Devonian. A 2-hour drill-stem test at 8,230-83 ft. recovered 120 ft. of heavily oil and gas-cut mud, and 460 ft. of oil-cut drilling mud. Gas came to the surface in 40 minutes and was estimated at 33,000 cu. ft. daily. Shut-in pressure rose to 3,240 lb. in 30 minutes. A previous test at 8,190-8,230 ft. recovered 720 ft. of oil and gas-cut mud in 90 minutes. Location is 7 miles west of Gulf Refining Co. 1-E A. Fogelson-University, discovery of Jordan Ellenburger field.

A southeast extension well to TXL field was being completed at Rowan Drilling Co. 3 J. E. Parker. A 5½-hour drill-stem test at 7,799-7,860 ft. brought gas to the surface in 4 minutes and oil in 70 minutes, which was allowed to flow into pits until the well cleaned itself. Then turned into storage, the well flowed 63 bbl. of oil in 3 hours and 40 minutes. Operators drilled out to 7,878 ft. to run casing for completion tests.

Another field was in prospect for the J. M. and Margaret A. Shannon estate, in northwestern Crockett County. V. B. Phillips 1 Shannon estate was reported to have run the bailer 10 times, without being able to lower fluid level, in testing limestone at 2,356-57 ft. Amount of oil recovered was not announced. Later, it pumped

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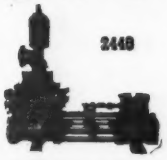

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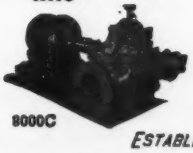

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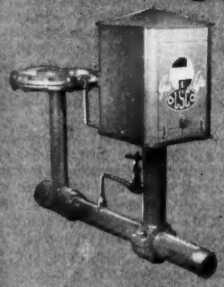

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24½ bbl. of oil in 1 hour, which did not lower the fluid level. No water was reported with the oil.

Sun Oil Co. 2 Fred Jameson, scheduled to be the fourth producer for Jameson field of Coke County, was also promising to become the largest well in the field. Additional pay zone was perforated at 6,365-6,400 ft., increasing the flow to 252 bbl. of oil in 16 hours, through ¼-in. choke. At that rate, its daily rate would be 380 bbl. of oil. It was shut in to move the rig and to empty storage tanks before making completion tests.

In Gaines County, Honolulu Oil Corp. 1 J. M. White et al, set casing at 6,930 ft., after recovering 5,500 ft. of clean oil, 200 ft. of oil-cut water, and 300 ft. of clear water, on a drill-stem test on the Clear Fork zone at 6,898-6,973 ft. Operators planned to test open hole when plugs are drilled. The well is making considerable water but is thought to have enough pay zone even though the water is found to be coming from the bottom. Following the test, 11 stands of drill pipe unloaded oil, and heads developed while the remainder of the pipe was being pulled. Location of the well is 9 miles south of Russell field and 9 miles west of Seminole field.

WEST TEXAS WILDCAT FAILURES

Crockett County: Shell Oil Co., Inc. 1 University, Sec. 21, Blk. 39, University Lands, 1½ mi. SW Stanolind 1-GG University, dry, TD 9,064 ft., recovered some oil and gas from 8,281-84 ft., base Pennsylvanian shale and top Ellenburger 8,040 ft., top Milberns sand 8,975 ft., elev. 2,572 ft.

Garza County: Anderson Brothers 1 J. S. Henderson, Sec. 47, Blk. 6, H&GN Sur., 6 mi. W Justiceburg, dry, TD 2,548 ft., salt 728-895 ft., Yates 964 ft., San Andres 2,050 ft., elev. 2,298 ft.

Midland County: Magnolia Petroleum Co. 1 Roy Glass, Sec. 30, Blk. 40, T&P Sur., 18 mi. SE Odessa, dry, TD 5,569 ft., Yates 1,630 ft., San Andres 2,679 ft., elev. 2,885 ft.

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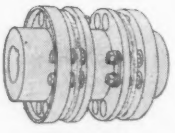
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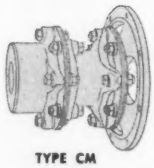
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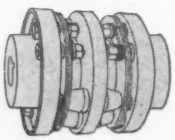
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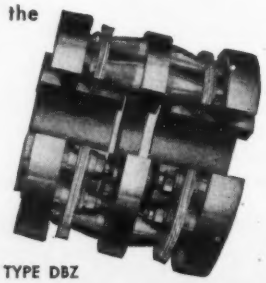
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CANADIAN FIELDS

Leduc Field Rapidly Expanding

CHATHAM.—In the Leduc field, central Alberta, Imperial Oil now has 3 wells definitely in production, with potential aggregate of around 1,000 bbl. on unrestricted flow. Official production figures have not been made public. The Imperial-Leduc discovery well, LSD 5, 22-50-26w4, completed in Devonian limestone at 5,066 ft., is producing around 187 bbl. through 3/8-in. choke, about half its potential.

Imperial-Leduc 2, LSD 1, 16-50-26w4, cemented off salt water intrusion at 5,413 ft. after which casing was set and perforated at oil levels above the water zone. Following acid treatment with 250 gal., swabbing was resumed, and on the sixth lift the well blew in. A 24-hour run with ⅛-in. choke showed 100 bbl. Imperial-Leduc 3, LSD 10, 26-50-26w4, finished at 5,313 ft. blew in after swabbing a short time, and on a test of 8 hours open flow and 16 hours on 5/16 choke produced 343 bbl. Imperial-Leduc 4, LSD 16, 15-50-26w4, offsetting the discovery to the west, is finishing below 5,303 ft. and Imperial-Leduc 5, LSD 8, 21-50-26w4 is below 2,603 ft. Imperial-Leduc 6 is rigging in LSD 1, 22-50-26w4. Derrick from No. 2 has been moved for Imperial-Looma 1, LSD 4, 10-50-23w4, in wildcat territory about 20 miles east of Leduc but in the same general area.

On the basis of the three producers and previous geological information the field is estimated to extend northwest and southeast approximately 9 miles, with a width of 3 miles, an area 7 square miles greater than Turner Valley.

Globe-Leduc 1, LSD 6, 19-50-26w4 is expected to spud early in June. Globe-Leduc 2 has location in LSD 9, 34-50-26w4. Other close-in locations are Continental-Leduc 1, LSD 9, 33-49-26w4, south of the field, and Leduc-West 1, LSD 6, 19-50-26w4. Leduc-Consolidated Oils, sponsored by a group of Turner Valley companies headed by Gas & Oil Products, Ltd., has location ¾ mile south of Imperial-Leduc 3.

South of the field McColl-Frontenac 14-14, LSD 14, 14-48-27w4, is below 560 ft. Farther south, in the Wetaskiwin area, McColl-Frontenac 3-22, LSD 3, 22-46-23w4 is below 529 ft. with McColl-Frontenac 1-20, LSD 1, 20-46-26w4 is rigging. The same company has secured reservation on 600,000 acres 5 miles or more west of Imperial-Leduc 1 discovery.

Jumping Pound.—In the Jumping Pound field, west of Calgary, Shell 5-7-I, LSD 5, 7-25-4w5 has entered the lower porous zone of the Madison limestone around 9,973 ft. with completion expected around 10,050 ft.

Virginia Hills.—Immediately south of the Alberta government reservation of Virginia Hills, about 25 miles northwest of Edmonton, Gulf Oil has secured a reservation of 793,455 acres. Holdings are in townships 58 to 60, ranges 3 to 10w5; townships 57 to 59, range 27w4 and 57 to 60, ranges 1 to 3w5; and townships 57 to 60, ranges 10 to 13w5. The area is previously untested, but geological conditions are believed similar to those in the Alberta plains area farther south.

Pakowki.—In the Pakowki area, southern Alberta, McColl-Union 6D-21-4-10, LSD 6, 21-4-10w4, has been finished at 2,273 ft. with 3,300,000 cu. ft. open flow. McColl-Union 7C-34-39, LSD 7, 34-3-9w4 is coring at 2,202 ft. McColl-Union 13-5, LSD 13, 5-6-7w4 is coring below 2,282 ft. and the 7C-1-4, LSD 7, 1-4-10w4 has spudded.

Lloydminster.—Definite production figures are available on several recent completions in the Alberta section of the Lloydminster field. G. L. Globe 1, LSD 4, 2-50-1w4, finished at 1,893 ft. with 80 bbl. initial production. Superior 2, LSD 4, 14-50-2w5 finished at 1,994 ft. with 90 bbl., and Superior 3, LSD 5, 14-50-2w4 finished at 1,997 ft. with 100 bbl. Superior 4, SW 6, 14-50-2w4, finished at 1,989 ft. with lower Cretaceous

at 1,822 ft. and oil sand at 1,980 ft. and is testing.

In the Lloydsask areas, Command-Globe 7, SE 8, 15-47-27w3 bottoming at 1,873 ft. is testing with lower Cretaceous at 1,682 ft. The Dimsdale 2, SW 2 14-50-2w4, bottoming at 2,007 ft. is testing with lower Cretaceous at 1,834 ft. and Sparky sand at 2,004 ft.

In the Lloyd-Sask area, Command 8, NE 5 15-47-27w3, has been abandoned at 2,005 ft. after getting lower Cretaceous at 1,677 ft. Lloydminster 14, LSD 14, 24-49-28w3 has finished at 1,906 ft. with lower Cretaceous at 1,663 ft. and oil sand at 1,828 ft. Manitou 2, SW 6, 31-48-27w3 bottoming at 1,874 ft. is testing with lower Cretaceous at 1,702 ft. and oil sand at 1,863 ft. Manners 2, SW 10, 35-48-28w3 finished at 1,920 ft. with lower Cretaceous at 1,704 and oil sand at 1,874 ft.

Watford.—In the Watford area, Lambton County, an important deep test is being drilled for Imperial Oil on lot 10, Concession 13, Brooke Township. Location is ½ mile due south of a deep test drilled on the same lot by Michigan-Pacific Oil Co. in 1932 and abandoned at 2,637 ft. owing to financial difficulties after striking oil shows and some gas in the Clinton formation at 2,010 ft. Some 1,200 ft. of light crude was standing in the hole before it was plugged.

North and west of the Michigan Pacific well, the Wilson-Sullivan Development Co. is starting, in lot 8, Concession 6, Warwick Township, the first of a series of 10 shallow wells.

Farther east, in Metcalfe Township, Middlesex County, W. Hussey of Petrolis is starting a test on the Edgar farm, lot 2, Concession 2, for Detroit interests. The Wilson-Sullivan company has spudded No. 3 shallow test on the Johnson farm, lot 3, Concession 2, Metcalfe.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 p.m. Eastern Daylight Saving time, Wednesday, June 25, 1947, for land described herein situated within the known geologic structure of the La Barge field, 6th P.M., Wyoming. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act of February 25, 1920 (41 Stat. 437, 30 U.S.C. sec. 181), as amended, in the following parcels, all in T. 27 N., R. 113 W.: Parcel No. 1, sec. 22, SW¼SW¼, 40 acres, Parcel No. 2, sec. 27, NW¼SE¼, 40 acres. Total 80 acres. Bids must be submitted on each parcel separately but if both parcels are awarded to the same bidder, they may be included in a single lease. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil and 12½ per cent to 16 2/3 per cent for gas in accordance with Schedule B in the lease form. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., and each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank, or by money order, made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.42(b) and (c). The envelopes should be plainly marked, "Bid for Parcel No. , La Barge field, Wyoming. Not to be opened before 1 p.m. Eastern Daylight Saving time, Wednesday, June 25, 1947." No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a corporate surety bond in the sum of $1,000 must be furnished by a successful bidder prior to the issuance of a lease. A $5,000 corporate surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Fred W. Johnson, Director.

ROCKY MOUNTAIN

Big Horn Basin Prospects Improved by Technical Skill

DENVER.—Technical skill is achieving results in the 10,000-ft. wells drilled out in the Big Horn Basin in northern Wyoming in the past year. When Pure Oil Co. completed its 1 Unit in 18-48n-92w on the Worland Dome, Washakie County, a year ago for 25 bbl. of oil per day with 250,000 cu. ft. of gas, at a plugged back depth of 10,131 ft., there was considerable skepticism concerning the commercial value of the discovery, especially since the gas had an unusual high content of hydrogen sulphide. The 41.8°-gravity oil was yellowish-green in color and very different from the Embar crude in fields around the rim of the basin. The final results given above followed months of difficulties, especially freezing up of tubing and pipe corrosion.

No. 2 Unit, 1¼ miles northwest of the discovery, apparently did not improve the prospects very much when final tests listed it as flowing 78 bbl. per day through a ⅜-in. choke. No. 3, a mile southeast of the discovery, was higher on structure, and the best of the three wells, flowing 366 bbl. in 24 hours through a ¼-in. choke. All of the wells had been acidized.

After months of experimenting to overcome the various production problems, the picture shows a decided change. The three wells now are making around 1,500 bbl. per day. The three wells also produce considerable gas, up to 10,000,000 cu. ft. per day, with substantial quantities of distillates in the Frontier sands as shown by drill-stem tests. The No. 5 Unit, a mile southeast of 3 Unit, is being given a production test, and on latest report flowed 90 bbl. of 60°-gravity oil with 4,260,000 cu. ft. of gas, through perforations opposite the second Frontier sand, topped at 7,247 ft., in 15 hours.

The next of the three basin structures to be proven was Neiber Dome, 18 miles to the south, which was completed at 10,189 ft., plugged back total depth, which flowed at the rate of 768 bbl. per day, the oil being 40° to 41° gravity. Conditions were very similar to those encountered at Worland, but it is believed they are about to be overcome. A stainless steel christmas tree has been installed, and special tubing coated with plastic applied under intense heat and pressure has been run. The one problem now being worked on is to connect up the tubing so that the threads at a vital point will be protected from corrosion.

In between the Worland and Neiber structures, but several miles farther to the east, General Petroleum Corp. completed the third of these basinward discoveries in its 88-24-G SE SE SE 24-46n-92w, in the Embar at a plugged back total depth of 10,269 ft. last week, pumping 202 bbl. per day of 29°-gravity oil. Unlike the other discoveries, however, the gas is sweet, and no shows were reported in the upper formations.

Church Buttes.—Mountain Fuel Supply Co.-Union Pacific 2 Unit, NE NE NE 22-17n-112w, Church Buttes structure, Uinta and Sweetwater counties, Wyoming, is unofficially reported to have shown for an estimated 50,000,000 cu. ft. of gas per day on test in sand below the 7-in., which was cemented at 12,445 ft., with a flowing pressure of 6,000 psi., and bottom-hole pressure of 7,200 psi. It continues to be a tight hole. This well is located 4¾ miles northeast of the discovery. The No. 3 Unit, NE SW NE 12-16n-113w, 1½ miles west of the discovery, is still fishing for drill pipe at 12,960 ft., total depth. Location for 4 Unit is C NW NW 29-16n-112w, 2½ miles south of the discovery, and 5 Unit C NW NW 10-16n-112w, 3 miles east of the discovery.

Oil show at Saddle Horse.—M. Seigel 1 Government, SE SW SE 20-36n-62w, 20 miles east of the Lance Creek field, Niobrara County, Wyoming, is moving in cable tools to test show of oil in the Leo sand of the Minnelusa formation. Top of Leo was at 1,870 ft., total depth is 1,943 ft. The 5½-in. has been run. Spotted saturation was reported down to 1,897 ft. when cores to the bottom showed good saturation. The Leo is the principal producing horizon at Lance Creek.

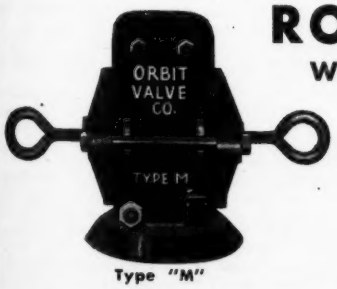
New operations continue to hold to a high record with 27 the past week, of which 4 were in Colorado, 12 in Wyoming, and 11 in Montana. Five were wildcats. Twenty-four wells were completed, of which 19 were oil, 3 were gas wells and 2 were dry holes.

COLORADO WILDCAT FAILURE

Mancos, Montezuma County: Anderson Oil Co. 1 State, C NW SW 36-36n-14w, TD 1,191 ft. in Morrison, plugged and abd., Dakota 445 ft., Morrison 611 ft.

WYOMING WILDCAT FAILURE

Natrona, Natrona County: British-American Oil Producing Co. 1 Unit, NE NE SW 27-36n-83w, TD 4,953 ft., dry, Dakota 4,480 ft.; Morrison 4,640 ft., Sundance 4,752 ft.



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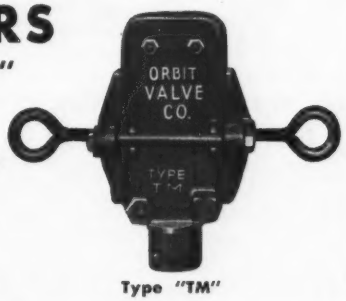

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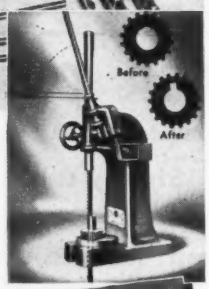

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OKLAHOMA

Northeast Elmore Well Flows 49.9° Gravity Oil

SINCLAIR PRAIRIE 1 Nichols, NW NW SE 14-2n-2w, Garvin County, flowed 145 bbl. of 49.9°-gravity oil through 20/64-in. choke, while testing perforations in Pennsylvanian at 6,420-26 ft. Gas was gaged at 2,910,000 cu. ft. per day. This is a southwest offset to the discovery well of the Northeast Elmore pool and will be the fourth completion in the pool.

Carter Oil Co. 1 Roady, SW NW 5-1n-1w, Garvin County, recovered 720 ft. oil in 9 minutes on drill-stem test in Gibson sand topped at 6,090 ft. Operators are coring at 6,143 ft. This test is the south offset to the Katie pool discovery well.

Carter Oil Co. 1 Harrison, SW SW 31-5n-3w, McClain County, a diagonal offset on 40-acre spacing to the East Lindsay pool discovery well which produced from Hunton lime, recovered 450 ft. clean oil and 1,150 ft. of water on drill-stem test in Pennsylvanian at 7,644 ft.

Ned Biffle et al 1 Pharoah, NW NW NW 15-3n-2w, Garvin County, completed as a dry hole at 6,216 ft. in 1934, has been reopened and top of Gibson sand has been logged at 5,565 ft. Core from 5,570-80 ft. showed sand with spotted staining. Drill-stem test is being made. This test is about 2 miles northeast of the Southwest Antioch pool.

Sohio Oil Co. 1 Schemmer, NE NE SE 34-23n-1w, Noble County, flowed 110 bbl. oil per hour for 3 hours through open tubing from Bartlesville sand topped at 4,461 ft. This is a southwest offset to the discovery well of the South Ceres pool.

Mid-Continent Petroleum Corp. 2 Terry, SE SE SW 30-12n-7e, Okfuskee County, in the Garden Grove pool, flowed 300 bbl. oil in 10 hours through perforations at 2,560-75 ft. in lower Wewoka sand topped at 2,566 ft. Pipe is set at 2,624 ft., 1 ft. off bottom. This is the third producing zone for Garden Grove pool, which was opened in Prue sand at 2,944-50 ft. by Mid-Continent 1 Baker, SE NE NW 31-12n-7e, in 1946. Earlsboro sand at 3,300 ft. was subsequently found productive.

Texas Co. 1 Carter, NW SW NE 25-17n-2e, Lincoln County, on drill-stem test in Hunton lime at 4,510-25 ft., showed 1,000,000 cu ft. gas per day, and recovered 900 ft. oil, 300 ft. mud and 800 ft. water. Seven-inch is set at 4,701 ft. Total depth is 4,750 ft. Mississippi was logged at 4,408 ft. and Hunton at 4,508 ft.

Wildcatting is active in Tillman County, where there are six active exploratory operations in addition to two completion failures and one new location for the current week.

OKLAHOMA SUCCESSFUL WILDCATS

Cotton County: Extension to SW Soldier Creek—Phillips Petroleum Co. 1-A Tollett, SW SE SE 7-3s-11w, pumped 49 bbl. of 35°-gravity oil per day from sand at 1,551-59 ft., TD 1,559 ft.

Extension to Walters—T. H. McCasland 1 School Land (Walker), NW SE SE 16-1s-9w, pumped 6 bbl. of 32°-gravity oil per day from sand at 2,160-82 ft.; sand 2,315-42 ft., 2,478-2,505 ft. and 2,943-64 ft., lime 3,328 ft., TD 3,387 ft.

Extension to Walters—T. H. McCasland 1-A Karty, SE NW NW 22-1s-9w, pumped 20 bbl. of 32°-gravity oil per day from sand at 2,141-63 ft.; no tops reported, TD 2,163 ft.

Oklahoma County: New pool — British-American 1 Van Ostrand, C SE SW 2-12n-2w, flowed 126 bbl. of 42°-gravity oil per day through 20/64-in. tubing choke from Hunton at 6,152-75 ft.; Pawhuska 2,950 ft., Carmichael 3,725 ft., Oread 3,905 ft., Tonkawa 4,085 ft., Avant 4,512 ft., Hogshooter 4,965 ft., Checkerboard 5,275 ft., Cleveland 5,425 ft., Oswego 5,850 ft., Sylvan 6,364 ft., TD 6,440 ft.

Pottawatomie County: New pay in West

Burnett—Continental & Phillips 1 Rosenbush, SE NE NW 19-8n-2e, pumped 250 bbl. of 37°-gravity oil per day through open tubing from Hunton at 5,390-5,429 ft.; Avant 3,590 ft., Belle City 3,670 ft., Hogshooter 4,088 ft., Checkerboard 4,490 ft., chert 5,385 ft., Sylvan 5,767 ft., Viola 5,860 ft., Simpson dense 5,928 ft., dolomite 6,003 ft., sandy dolomite 6,189 ft., second Wilcox 6,210 ft., TD 6,234 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Sleamaker-Deener 1 Bryson, SE SE SW 22-3s-12w, dry, TD 2,001 ft., no tops reported, no shows.

Vickers Petroleum Co. 1 Patton, NE NE SW 30-2s-12w, dry, TD 2,314 ft., no tops reported, no shows.

Anderson Drilling Co. 1 Rhodes, SE NE SE 12-1s-10w, dry, TD 2,510 ft., sand 2,209-26 ft., 2,312-36 ft. and 2,414-34 ft.

Hughes County: Mid-Continent Petroleum Co. 1 Loftis, NE NE NW 29-7n-9e, dry, TD 4,064 ft., Calvin 735-45 ft., brown lime 2,672 ft., first Booch 2,794 ft., coal 2,906 ft., second Booch 2,910 ft., Hartshorne 3,058 ft., Gilcrease 3,301 ft., Wapanucka 3,590 ft., Union Valley 3,858 ft., Cromwell 3,869-90 ft.

Jefferson County: Bay Petroleum Co. 1 J. R. Dean, NW SE NW 34-7s-6w, dry, TD 2,505 ft., no tops reported, no shows.

Stephens County: E. W. Stephens 1 Annie Berry, SE SE NW 35-1s-6w, dry, TD 2,500 ft., sand 1,000-02 ft., chert 1,170-71 ft., sand 1,547-71 ft. and 1,645-1,710 ft., no shows.

Tillman County: P. P. Langford 1 Grayson, SE SE SE 31-2s-17w, dry, TD 3,076 ft., Canyon 2,976 ft., no shows.

B. F. Weekley et al 1 Fox, NE NE NE 7-1s-15w, dry, TD 1,592 ft., chert and conglomerate 500-1,585 ft., granite 1,585 ft., no shows.

ILLINOIS

Good Oil Show in McClosky Between Two Old Pools

MATTOON.—R. B. Martin-Illinois Oil Co. 1 Higgins, NW NW NW 36-2n-14w, Wabash County, recovered gas, 1,600 ft. clean oil and 60 ft. oil-cut mud on drill-stem test at 2,893-2,900 ft. in McClosky lime. Glen Dean was logged at 2,428 ft., Barlow at 2,544 ft., Aux Vases at 2,804 ft., and Ste. Genevieve at 2,868 ft. Pipe was set on top of McClosky at 2,895 ft. This test is located midway between Parkersburg Consolidated and Lancaster pools.

Gilliam Drilling Co. 1 Provines, NW NE NW 34-3n-14w, Richland County, has pipe set to test McClosky at 3,124 ft. Drill-stem test recovered 30 ft. mud, 400 ft. oil and gas-cut mud and 330 ft. water. Lower Glen Dean was logged at 2,580 ft., Barlow at 2,751 ft., Paint Creek at 2,912 ft. and Ste. Genevieve at 3,093 ft. Total depth is 3,135 ft.

National Associated Petroleum Co. 1 Spiker, SE SE SE 12-3n-5e, Clay County, recovered 60 ft. oil and 30 ft. oil-cut mud from drill-stem test in Aux Vases at 2,781-2,803 ft. Total depth is 2,803 ft. Pipe is set at 2,799 ft. to test.

Inland Producers, Inc., 1 Harms, SE SE NE 19-1s-14w, Edwards County, swabbed 378 bbl. oil and 126 bbl. water, first 24 hours, from perforations in Cypress sand at 2,705-11 ft.

Joe Reznik 1 Grant, SW SW SE 13-7s-9e, White County, on pumping test of Hardinsburg sand, pumped and flowed 290 bbl. oil per day natural.

ILLINOIS WILDCAT FAILURES

Clay County: Skelly Oil Co. 1 Blair, SW SE SE 4-4n-6e, dry at 2,982 ft., Upper Menard 2,078 ft., Glen Dean 2,317 ft., Barlow 2,465 ft., McClosky 2,820 ft.

Edwards County: N. A. Cummings 1 Clark, NW NW NW 29-1s-10e, dry at 3,480 ft.

Cherry-Kidd 1 Irish, NW SW SE 11-1n-10e, dry at 3,330 ft., Glen Dean 2,665 ft., Ste. Genevieve 3,214 ft., McClosky 3,254 ft.

Fayette County: John C. Powell 1 Jobe Murray, SE SW NE 32-4n-1w, dry at 1,416 ft., Cypress 1,241 ft., Benoist 1,388 ft.

Hamilton County: Farm Bureau Oil Co. et al 1 Odell Heirs, SW SW SE 10-4s-7e, dry at 3,517 ft.

KANSAS

Rush County Wildcat Has Good Oil Show in Arbuckle

GREAT LAKES CARBON CO. et al 1 Dirks, SW SW SE 16-18s-18w, Rush County, recovered 1,250 ft. oil in 30 minutes on drill-stem test in top 19 ft. of Arbuckle lime. Topeka was logged at 3,145 ft., Lansing at 3,445 ft., and Arbuckle at 3,836 ft. Total depth is 3,855 ft. This test is a rank wildcat about 12 miles west of the Otis gas field.

Helmerich & Payne 2 Adams, SE SE SE 36-34s-30w, Meade County, had an estimated gas volume of 2,500,000 cu. ft. per day from Morrow sand, on drill-stem test at 5,875-5,992 ft. Morrow sand was topped at 5,880 ft. and Mississippi lime at 5,904 ft. Saturation was logged at 6,200-15 ft. Drilling is continued with tools below 6,000 ft. This test is about 5 miles northeast of Adams Ranch gas pool, which produces from the Mississippi lime.

Plains Exploration Co. 1 Darlington, NE SW SW 20-28s-9w, Kingman County, the second producer in the Pat Creek pool, is a maximum well. This is a northwest offset to the Pat Creek pool opener, Plains Exploration 1 Swander, SW SE SW Section 20, and is 1 ft. higher on the Viola lime. Two locations south of 1 Swander, Phillips Petroleum Co. 1 Darlington, SW NE NW

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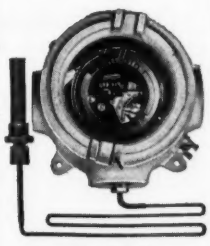

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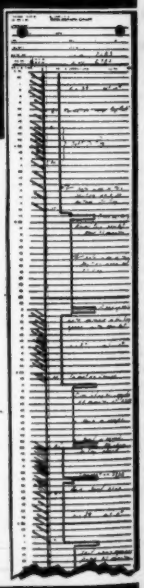

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Section 29, was completed as a dry hole.

Continental Oil Co. 1 Cotton, SE SE NW 14-12s-21w, Trego County, pumped 125 bbl. oil in 24 hours, through perforations from 0-6 ft. in the Arbuckle. Hole was drilled to 3,994 ft. and pipe was set 6 ft. in the Arbuckle at 3,948 ft. This test is located 1 mile east of the Cotton pool and the same distance north of the Northwest Ellis pool.

Texas Co. 1 Meeks, SE SE SW 36-8s-31w, Sheridan County, is a rank wildcat about 22 miles west of the Southwest Studley pool, which is the nearest production.

Cities Service 1 Wideman, CSL NE SW 21-9s-18w, Rooks County, filled up 2,240 ft. in 10 hours when plug was drilled. This well is about ¼ mile south of the Paradise Creek pool opener, and found the Arbuckle 1 ft. lower than the discovery well. The total depth is 3,589 ft. which is 9 ft. in the Arbuckle.

KANSAS WILDCAT FAILURES

Barber County: Skelly Oil Co. 1 Hattie B. Hamlin, SW NE NW 10-33s-12w, dry, TD 4,953 ft., Lansing-Kansas City 3,819 ft., Mississippian 4,386 ft., Kinderhook 4,580 ft., Viola 4,689 ft., Simpson 4,970 ft., Arbuckle 4,923 ft.

Butler County: Bennett & Abels et al 1 Boyles, SW NE SE 4-25s-4e, dry, TD 2,787 ft., Lansing-Kansas City 1,955 ft., Mississippian 2,689 ft.

Trego County: Bridgeport Oil Co. 1 Egger "A," NW NW NW 12-13s-21w, dry, TD 3,887 ft., Topeka 3,176 ft., Heebner 3,423 ft., Lansing-Kansas City 3,456 ft., conglomerate 3,820 ft., Regan 3,872 ft., granite 3,884 ft., no shows.

MISSOURI

Two Northwest Missouri wildcat locations have been made, the first in many months. Drilling machines are on the ground for both. One is 1½ miles southwest of Cameron, in Clinton County, Missouri, where W. M. Pappas of St. Joseph, and his associates will drill 1 Everett Kester in NE SE 28-57n-30w. This test wil go at least to the Mississippi lime. The other is 9 miles north of Stanberry, in Gentry County, where J. E. Palensky of Vermilion, S. D., and his associates will drill 1 J. M. Slagle & Son, in SW NE 13-64n-33w. This test will go to the Hunton lime. M. M. Fontaine Drilling Co. has the contract for both proposed tests and expects to start drilling soon.

LA.-ARK.

Oil Reported in Union Parish Tight Wildcat

SHREVEPORT.—Union Parish wildcat 7 miles northwest of Farmersville, in 23-22n-1w, which has been drilled as a tight well, last week was reported to have oil in the hole. Various estimates on the amount were unconfirmed. At total depth of 3,490 ft., in an unnamed formation, it was said to have set casing at 2,250 ft., perforated at 2,149-50 ft., from which depth oil followed the perforating gun out of the hole. Reported gravity was 22°.

A later report indicated new perforations at 2,146-47 ft., after plugging back to 2,181 ft. An unestimated amount of oil flowed through open casing; and when shut-in pressure rose to 75 lb. The flow was killed with fresh water to run tubing, after which it flowed at the rate of 6 bbl. of fluid per hour, making about 50 per cent oil. Sand being tested is said to be in the Nacatoch.

J. F. Lent's 1 E. L. Whatley, 20-10n-10w, Natchitoches Parish, made new perforations and additional tests. New holes at 3,274-82 ft. resulted in 10 bbl. of oil an hour flowing through 3/8-in. choke, for a period of 1 hour and 50 minutes, at which time it died. Shut in 12 hours, then swabbed 5 hours, it flowed an estimated 1 bbl. of fluid per hour, cutting 65 per cent oil of 41.5°-gravity.

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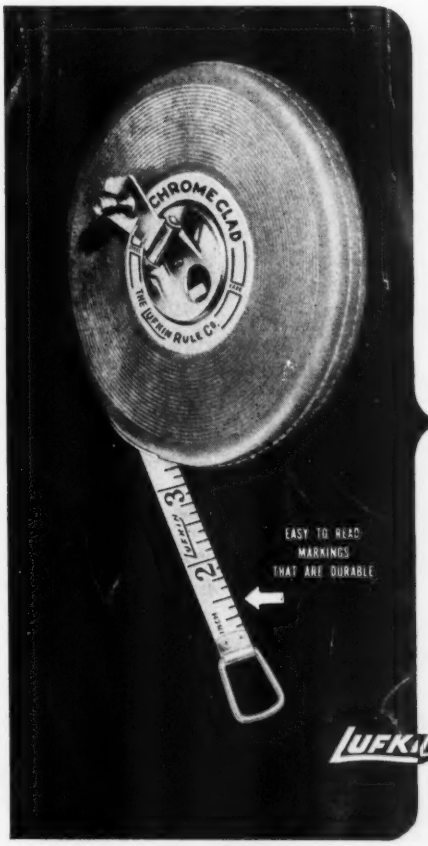

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LUFKIN FOR ACCURACY

of Bull Bayou field, British American Producing Co. 1 T. Wimberly, 2-13n-10w, plugged back to 2,775 ft., in the Paluxy, from 7,508 ft. Operators were waiting on pumping unit. Their estimates range to 40 bbl. of oil and 200 bbl. of salt water ,as potential of the well.

In Arkansas, north of McKamie field in Lafayette County, McAlester Fuel Co. 1-A Texas Co.-Lee, was taking additional cores. Recovery from 9,052-62 ft. had a good gas odor in fairly porous to porous oolitic limestone. Side-wall cores at 8,135 and 8,142 ft. in shale and at 8,142, 8,159, 8,300, and 8,576 ft. in sand had no shows. In drilling the well, oil shows were logged in samples of the Cotton Valley at 7,976-90 ft. Operators were running casing before making a test of that interval.

ARKANSAS WILDCAT FAILURES

Hempstead County: Barnsdall Oil Co. 2 Shultz et al, SW SW 34-13s-26w, dry, TD 4,720 ft., Tokio 1,397 ft., Paluxy sand 1,757 ft., Massive anhydrite 2,557-2,670 ft., James limestone 3,007 ft., Pettit porosity 3,210-26 ft., Travis Peak 3,252 ft., Cotton Valley 3,880 ft., igneous 4,658 ft., elev. 260 ft.

Ouachita County: A. B. Turner 1 Girvis Haltom, SW NW NW 18-15s-18w, dry, TD 2,280 ft., no tops reported.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Madison Parish: Discovery of Indian Lake field—Marine Oil Co. 1 Ayer Timber Co., NW SW SW 19-15n-10e, flowed 6 bbl. of 65°-gravity distillate and 1,500,000 cu. ft. of gas from Tuscaloosa at 5,631-37 ft., open 2 hours, flowed through 3/16-in. choke, tubing pressure 1,750 lb.

NORTH LOUISIANA WILDCAT FAILURES

De Soto Parish: Triangle Drilling 1 J. F. Fisher, SE SW SW 10-14n-15w, dry at 4,535 ft., Nacatoch 1,322 ft., Lower Cretaceous 2,793 ft., Paluxy 3,020 ft., elev. 286 ft.

East Carroll Parish: Stanolind Oil & Gas 3 Chicago Mill, C 9-18n-12e, dry at 3,952 ft., no tops reported.

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OHIO, KENTUCKY

Preston Oil Reports Large Medina Well

COLUMBUS.—Preston Oil Co. reported the largest initial production for a Medina sand oil well in its 1 George E. Shilling, Section 9, Salt Creek Township, Muskingum County. The producer was drilled deeper from the Clinton, where it had been a small pumper, to the Medina sand at 4,162-74 ft. After being shot, the well flowed 60 bbl. and swabbed 20 bbl. in 24 hours.

Industrial Gas Corp., now National Oil & Gas Corp., reached 6,910 ft. in the St. Peter test on M. J. Wickham in Section 10, Salt Creek Township, Muskingum County, before plugging back to test the Medina. No showings were found in the St. Peter, and two water sands below led to the decision to plug back. The same company drilled in and shot its 1 N. W. Leland, Section 14, Brush Creek Township. Clinton sand was found at 3,688-3,727 ft. with a natural open flow of 393,000 cu. ft., and 15 hours after shot 784,000 cu. ft.

Ditch & Gerig 1 Harry Gerstenschlager, Section 3, Canaan Township, Wayne County, made 744,000 cu. ft. with 1,000-lb. pressure in the Newburg sand in a test west of Creston and north of the old Clinton field. The sand came in at 2,737-47 ft., and the well was tubed without shooting.

Another good gas well was completed in Big Prairie pool in Ripley Township, Holmes County. Ohio Fuel 1 Myrtle Lake, Section 32, logged Clinton sand from 3,112-71 ft. with 1,290,000 cu. ft. natural at 3,165-71 ft.

Stark and Washington counties each report three new operations for the week, while Muskingum reported two and nine other counties reported one each. Completions totaled 24 with Cambridge in the lead with eight.

WESTERN KENTUCKY

OWENSBORO.—Sun Oil Co. 1 T. T. Williams, 24-R-20, Henderson County, has been completed as a 30-bbl. pumper after 10-qt. shot. Production is from Waltersburg sand logged at 1,857-67 ft. Total depth is 1,867 ft.

Gurley Smith et al 1 H. Smith, 18-I-32, Butler County, located about 1 mile east of the Rochester pool, is drilling below 658 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: Sun Oil Co. 1 T. T. Williams, 24-R-20, IP 30 bbl., Waltersburg sand 1,857-67 ft., TD 1,867 ft.

INDIANA

EVANSVILLE.—The Texas Co. 1 R. R. Golden, NE NW SE 19-5s-13w, a ¾-mile extension to the North Springfield pool, has been completed as a 72-bbl. pumper, natural. Production is from Waltersburg sand at 2,116-23 ft. Total depth is 2,126 ft.

C. A. Lynch 1 Fleener, NW SE SW 22-3s-12w, Gibson County, will be put on pump to test Waltersburg sand logged at 1,872-80 ft. after swabbing 10 bbl. oil per hour.

INDIANA SUCCESSFUL WILDCAT

Posey County: Texas Co. 1 R. R. Golden, NE NW SE 19-5s-13w, IP 72 bbl. natural, Waltersburg sand 2,116-26 ft., TD 2,126 ft., Pennsylvanian 527 ft., Kincaid 1,733 ft., Menard 2,035 ft.

INDIANA WILDCAT FAILURES

Gibson County: Dickerson-Lieberknecht et

al 1 Briner, dry at 2,033 ft., Glen Dean 1,525 ft., Cypress 1,763 ft., Ste. Genevieve 1,959 ft., Rosiclare 1,982 ft.

Pike County: J. L. Taylor 1 Troxler-Jones Community, SE 14-1n-9w, dry at 1,050 ft., drilled through Waltersburg sand.

EASTERN KENTUCKY

Two completions and a dry hole were noted during the holiday week, with Kentucky & West Virginia Gas Co. operations.

Well No. 5961, Harvey Johnson land, Floyd County, was completed at 3,463 ft., with 119,000 cu. ft. of gas in shale, A.S., and No. 5715, W. J. Ward land, Martin County, was completed at 2,390 ft., with 79,000 cu. ft. in Big lime.

Well No. 812, E. L. Pinson land, Pike County, a deepening operation, was dry at 3,390 ft.

CALIFORNIA

New Shallow Oil Zone Found

LOS ANGELES.—Chanslor-Canfield-Midway Oil Co. has stirred considerable speculation by coring a new oil zone in the Grapevine-Tejon in its well No. 16-32. The well logged approximately 30 ft. of good oil sand in the Upper Chanac zone. This zone, topped at 1,976 ft., previously has never been logged in the area, and the relatively shallow find has aroused considerable speculation as to the possible existence of the zone in other parts of the area. Moreover, if the zone does exist elsewhere in the area, it may be considerably thicker than the section logged in the present test.

Production potentialities of the No. 16-32 have not been made public, but the hole has been drilled to a total depth of 2,624 ft. and 8⅝-in. casing cemented to 2,553 ft. preparatory to completing the well.

Discovery of oil in the Buttonwillow area, or Miramonte area, in the Pacific Western Oil Co. 1 National Royalties, 5-26s-22e, Kern County, is still a possibility,. it was learned last week. Pacific Western has recovered 5½-in. casing to a depth of 9,504 ft. and is now conditioning mud and making other preparations which indicate a redrill job may be undertaken within a few days.

The 1 National Royalties was originally drilled to a depth of 16,668 ft., a world's record at that time, where it was halted by stuck drill pipe. Drill pipe was successfully recovered to a depth below 14,000 ft. and the well was then plugged back and tested at intervals to a depth of approximately 10,000 ft. These tests were ineffective, but it is believed that production was prevented due to formations being clogged by the heavy mud which was in the hole during the course of more than a year's drilling. Present plans call for attempting to side-track out from a depth of 9,504 ft. and re-drilling to a point between 12,000 and 13,000 ft. where oil and gas showings were encountered in the original hole.

While drilling ahead below 7,175 ft. in the 65-3 McGrath, 30-2n-22w, confirmation test to a recent discovery in the Oxnard Plain, Montalvo area, Ventura County, Standard Oil Co. of California is rigging up to start the 1 Maxwell, 23-2n-23w. Located almost 2 miles northwest of the discovery well, the 2 McGrath, the 1 Maxwell not only will be an outpost well, but will also be carried down as a deep test for the area.

Shell Oil Co. is coring ahead below 10,164 ft. in its prospective deep discovery in the Long Beach field, the 2 Dolley, 29-4s-12w. On a formation test of the interval at 10,030-10,119 ft. during the past week, the well would not flow and it was decided to drill ahead. This well aroused considerable interest two weeks ago when it was reported to be flowing large amounts of oil from a new deep zone at approximately 10,030 ft. during water shut-off tests.

The Marine Exploration Co. is setting boilers preparatory to deepening the 1 State, 11-5s-12w, in the Seal Beach area of Los Angeles County, an exploratory well which was whipstocked offshore from the southern limits of Seal Beach about 3 years ago. The well originally was drilled directionally for approximately 7,000 ft., and was 3,500 ft. off vertical from a mainland drill site when drill pipe became stuck. This was at the time when Washington was in an uproar from the Tidelands Oil Bill, and work was suspended at the 1 State. It was reported to have logged some oil sand before suspending.

New locations during the past week totaled 43, an increase of five over the previous week. Leading in projected new work was the Wilmington field with five new locations, and Grapevine-Tejon and Cymric each with four. The Athens, Santa Fe Springs, and Midway-Sunset fields each received two new locations, while the remainder of the new tests were scattered throughout the various areas of the state.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, McKittrick Area: The Texas Co. 28-28 Tulare NCT One, 28-30s-22e, flowed 51 bbl. 43.3°-gravity oil through 6/64-in. choke, 8.0 cut, perf. 5,890-5,960 ft. and 6,080-6,130 ft., TD 6,548 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, South Belridge Area: Richfield Oil Corp. 1 Berry, 30-28s-21e, elev. 729 ft., dry, TD 10,034 ft.

Monterey County, King City Area: Shell Oil Co. 1 Honolulu-Thourp-USL, 4-20s-7e, dry, elev. 1,445 ft., TD 6,777 ft.

Orange County, West Newport Area: Barnsdall Oil Co. 1 Capron-Menvig, 17-6s-10w, dry, elev. 85 ft., TD 2,823 ft.

Tulare County, Terra Bella Area: Smith and Larsen 1 Moore, 28-22s-27e, dry, elev. 459 ft., Granite 1,425 ft., TD 1,435 ft.

Ventura County, Conejo Area: Joseph Schuck No. 2, 33-2n-20w, dry, elev. 350 ft., TD 670 ft.

Conejo Area: Joseph Schuck No. 3, 33-2n-20w, dry, elev. 350 ft., TD 220 ft.

Yolo County, Dunnigan Hills Area: The Texas Co. 2 Dunnigan Unit One, 26-11n-1w, dry, elev. 193 ft., Base Capay 2,460 ft., TD 4,000 ft.

New Washington Area To Be Explored

SEATTLE.—Harmony-Pacific Oil Co. has leased 100,000 acres southwest of the town of Humptulips in Washington state, and is planning to start the first exploratory test on the block in June.

Extension Assured in S.E. New Mexico Field

HOBBS.—A south extension to the Brunson Ellenburger field near Eunice in Lea County was assured at Rowan Drilling Co. and Neville G. Penrose, Inc. 6 Walden. A drill-stem test at 7,646-92 ft. brought gas to the surface in two minutes and flowed oil at the end of five minutes. Flow was gaged at 20 bbl. of oil the first hour, and 21 bbl. an hour for 2 hours flowing through ¼-in. choke. Operators then deepened to 7,775 ft., packed off at 7,699 ft. and recovered 12 bbl. of oil at the end of 2 hours. Testing is being continued.

Northwest of the Drinkard (Clear Fork-Yesso) field in east central Lea County, Barnsdall Oil Co. 1 Elliott-Federal, 20-21s-37e, recovered 180 ft. of slightly oil and gas-cut drilling mud on a drill-stem test at 6,630-85 ft. Shows of oil and gas were also logged while drilling at 6,709 ft. in limestone.

TEXAS PANHANDLE WILDCAT FAILURES

Collingsworth County: Union Producing Co. 1 Glenn Ranch, 8½ miles NE of Wellington, dry at 4,180 ft. in Pre-Cambrian, drill-stem test 2,241-55 ft. recovered drilling mud with no shows.

Sherman County: Shamrock Oil & Gas 1 Boothe, 3½ miles SW of Stratford, dry at 3,428 ft., water sand 3,126 ft. with no shows.

MISSISSIPPI

Humble Nears Completion Of Distillate Discovery

JACKSON.—Humble Oil & Refining Co. last week was nearing completion of its wildcat in Marion County as a distillate discovery. The 1 Tullos, in 12-1n-18w, squeezed holes at 9,038-42 ft. and reperforated at 9,018-25 ft. A 10-hour and 43 minute test of this section produced a flow of sweet gas, 1,128 ft. of oil-cut fresh water, and 180 ft. of mud, with no salt water. These holes were also squeezed. Final perforations were at 8,996-9,003 ft. With packer set at 8,980 ft., the well put gas to the surface in 6 minutes and flowed at the rate of 1,780,000 cu. ft. of gas a day, with a continuous spray of dark distillate. Tubing pressure was 180 lb. When the tool was pulled the recovery was 1,051 ft. of 49.5°-gravity distillate and 45 ft. of drilling mud. Operators then ran tubing for completion.

In Jones County, Gulf Refining Co. 1 Major, 29-6n-11w, had more promising shows. Cores at 12,000-038 ft. recovered 6½ ft. of saturated sand, from the interval at 12,010-020 ft. One foot of sand having a show of oil was recovered from 12,020-28 ft., and 5 ft. of saturated sand was recovered from 12,028-38 ft.

Other wildcats drilling ahead were E. B. Lack and Nelson Exploration Co. 1 L. E. Ridgeway, 3 miles south of Star in Rankin County, which was drilling below 4,229 ft. in gray shale with streaks of sand and lignite. In Warren County, 2 miles south of Bellevue, Amerada Petroleum Corp. 1 Dabney-Bonelli, had total depth at 4,518 ft. in salt, and operators said an attempt may be made to drill through the salt. Top of the Lower Cretaceous was had at 4,200 ft., and top of the salt was 4,505 ft.

A.S.M.E. Chicago Meeting Expected to Attract 3,000

A total registration of approximately 3,000 is expected for the semiannual meeting of the American Society of Mechanical Engineers, to be held in the Stevens Hotel, Chicago, June 15-19.

About 100 engineers, scientists, authors, industrialists, and educators will participate as speakers in the 4-day technical program. Included in the technical meetings will be sessions on fuels, heat transfer, oil and gas power, and rubber and plastics.

Geologists Plan Trip

The West Central Colorado Field Conference of the Rocky Mountain Association of Geologists will be conducted June 16-19. Purpose of the trip is to study sediments in the Paleozoic basin between the Gore and Mosquito ranges on the east and Sawatch range on the west.

English Petrochemical Plant Taking Shape

(Continued from page 47)

secondary units produce numerous chemicals from the gases and finished purified substances.

Primary Plant

Catarole units. — These consist of five cracking furnaces, three of which will work simultaneously supplying a regular gas feed to the gas purification and separation plants and a liquid product.

Gas-purification plant. — A process for the removal of hydrogen sulfide and carbon dioxide by a liquid medium has been adopted; it reduces the concentration of H_2S to the required standard for town gas.

Gas separation plant. — This plant works according to the principles mentioned above in the short description of the process.

Distillation.—The primary distillation of the liquid product of the Catarole process is carried out, first under atmospheric and then under reduced pressure. The furnace used for vaporizing the charge is a conventional type tube still. A complete system of heat exchange operates both on the vapor and residue lines. Shell and tube equipment is used in the overhead condensers; coil and box coolers cool the side streams.

Atmospheric and vacuum distillations split the product into a fraction containing all the material boiling below 200° C., naphthalene fraction, and several heavy aromatic fractions. The fraction boiling below 200° C. is further distilled in three steam-heated columns which operate at atmospheric and reduced pressures, according to the feed and produce a light hydrocarbon fraction, a benzene fraction, a toluene fraction, and various xylene fractions.

Secondary Plant

The secondary units will deal with the products emerging from the primary units. The separated gases are transformed into such substances as ethylene chlorhydrin, ethylene oxide, ethylene glycol, ethanolamines, ethyl chloride, ethylene dichloride, isopropanol, and acetone. The liquid and solid fractions are further separated and purified.

Pure, nitration grade, benzene and toluene will be produced with very high yields by azeotropic distillation with methyl alcohol. A column is used alternatively for the benzene and toluene fractions; the nonaromatics are distilled off. Residue containing the benzene or toluene is then chemically treated and rectified.

Production.—For the initial stage a total throughput of 50,000 tons a year is planned. Main products will be:

3,000-5,500 tons, pure nitration grade benzene.
3,000-5,500 tons, pure nitration grade toluene.
2,500-4,000 tons, 3° C. and 5° C. xylenes.
1,500-4,500 tons, alkyl benzenes and indene resins.
600-1,000 tons, pure naphthalene.
1,500-2,000 tons, mono-, di-, and trimethylnaphthalenes.
350-600 tons, higher polycyclic aromatics.
About 2,000 tons, high-grade coke for electrodes.
7,000-12,500 tons, nonolefinic gases, mainly hydrogen and methane.
4,500-5,500 tons propylene, to be transformed into isopropyl alcohol and acetone.
3,500-6,500 tons ethylene, to be transformed into ethylene derivatives and intermediates.

Design of the plant is, however, such that with an additional capital cost estimated to be not more than 25 per cent of the original investment the annual throughput can be increased to between 100,000 to 120,000 tons a year. If this increase in capacity is made, the production cost for a ton of throughput (including amortization) will be considerably less than that for an annual throughput of 50,000 tons.

The Partington plant will be operated by Petrochemicals, Ltd., a wholly owned subsidiary of Petrocarbon, Ltd. Chairman of Petrochemicals, Ltd., is H. Stuart Ebben. Chairman of Petrocarbon, Ltd., is R. Ashton Hamlyn. Managing directors of both companies are Dr. F. Kind and Dr. G. Tugendhat.

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Drilling Contractors

Wichita Men Sell Interest In Biddle Drilling Co.

Biddle Drilling Co., Great Bend, Kans., has recently undergone a reorganization. Lloyd R. Pickrell and Don C. Ross, both of Wichita, have sold their interests in the tools to Irvin Biddle. However, they will keep their interest in the producing properties of the company.

Doris Ballew has brought in a producer in LaGrange field, Adams County, Mississippi. Initial production was 116 bbl. oil per day through 9/64-in. choke on tubing. The well is the Texas Pacific Coal & Oil Co. 3 O. L. Wilson, 1,320 ft. east of 2 Wilson, 8-6n-2w.

Keys Drilling Co., Elmwood, Kans., will drill a wildcat of its own, 1 Marshall, NW NW NW 25-11-18, 1 mile southwest of Burnett pool, Ellis County, Kansas.

Mercury Drilling Co., Tulsa, and P. G. Lake, Inc., are moving in rotary for a wildcat, the 1 Beck, NE SE SW 11-15n-8e, Creek County, Oklahoma.

Crescent Drilling Co., Monroe, La., is rigging up rotary for Carter Oil Co. 2 Tena Crumpler, 731 ft. from south and east lines, SW NW 15-17s-19w, Columbia County, Arkansas.

Broadlee Drilling Co. has the contract for a wildcat, the J. J. Broadus et al 1 Newton County Bank, 661 ft. from north and 670 ft. from east lines, 9-6n-11e, 6 miles southwest of Decatur, Newton County, Mississippi.

Burden & Kemp have completed an oiler for Ralph Gilster, James E. Kemp, and Big Chief Drilling Co. in LaGrange field, Adams County, Mississippi. This well, the 1 E. C. Ogden, 280 ft. from south and 245 ft. from east lines, Lot 106, 9-6n-2w, flowed 170 bbl. in 20½ hours through 5/32-in. choke on tubing.

McDowell & Cook Drilling Co., Vivian, La., is to drill a 4,000-ft. test in Morehouse Parish, Louisiana, for H. E. Rondeau and associates, of Shreveport. Location is on a 12,000-acre block, in SW SW 2-20n-7e, and about 14 miles east of the Monroe gas field's eastern boundary. Plans call for test formations in the Cotton Valley series around 2,500, 3,100, 3,500, and 3,900 ft., all of which were said to have had shows of oil in a test of the same area, drilled in 1937, and by the same operators.

Bass Drilling Co. last week was below 6,800 ft. on Tide Water Associated Oil Co. et al 1 Longino-Henry unit, 9-16s-19w, Columbia County, Arkansas. Location is at the eastern end of Stephens field.

Crow Drilling Co., Shreveport, is rigging up rotary for Carter Oil Co. 15 W. T. Sturgis, C NE SW NW 1-17s-27w, Miller County, Arkansas.

Carter Wolf Drilling Co. is moving in rotary for a wildcat, 1 Gibson, NE NE SW 5-2n-2e, Garvin County, Oklahoma.

Rex Drilling Co., Shreveport, is moving in rig for W. J. O'Brien 1 Parker, 330 ft. from south and west lines, Lot 198, 8-6n-2w, Adams County, Mississippi.

Frizzell Drilling Co., Oklahoma City, has staked location for its 2 Johnson, NW NE SE 18-1s-8w, Stephens County, Oklahoma.

Penrod Drilling Co., Shreveport, is building roads for Sohio C-1 Beach et al, 330 ft. from south and west lines, Lot 132, 9-6n-2w, Adams County, Mississippi. This same concern is moving in material for a wildcat, the Hunt Oil Co. & Sun Oil Co. 1 H. L. Hunt Fee, C NW NE 21-1n-20e, 18 miles northwest of MacClenny, Baker County, Florida.

Standard-Fryer Drilling Co., Dallas, and Bruce Sullivan, Fort Worth, will drill five tests in the Anton (Clear Fork) field in southeastern Lamb and southwestern Hale counties, West Texas, for Anton Oil Co. In Lamb County, locations are for: 1 Stephenson, Section 31, Block I, R. M. Thompson Survey, northwest of production; the 1-B J. B. Tucker, a west offset to a 1-mile east extension to the field; and, 1 mile south of this well, the 1 A. L. Reese, Section 118, Block A, R. M. Thompson Survey. In Hale County, locations have been staked for 1 Myatt, SE SE Section 15, Block

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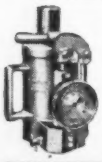

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DT, HE&WT survey; and 1 Lusk, SW SW, Section 15, Block DT, HE&WT survey. Both the latter locations are eastern outposts. Clear Fork pay is expected around 6,000 ft.

Spartan Drilling Co., Shreveport, is on location for a Travis Peak test, Buckner field, Columbia County, Arkansas. This wildcat is the A-2 Johnson-Nix, C NE NW 13-16s-25w.

Lowell Drilling Co. is moving in for its 1 Dippel, NW NE NW 23-19-10, Rice County, Kansas.

Wampler Bros., Longview, Tex., has contract for the E. B. Germany & Son 1 Blackstone, a northeast edge well, Hawkins field, Wood County, Texas.

Smiley Drilling Co. has set surface pipe on a wildcat in the Waukomis section of Garfield County, Oklahoma. This test will go to 7,300 ft. to test the Wilcox and is the North American Oil Consolidated 1 Pommitt, C NE SE 34-21n-6w.

R. P. Burkin is the contractor for the Frank Buttram 1 A. E. Slay, SE SE 9-9n-13w, on the edge of Converse field, Sabine Parish, North Louisiana.

Commonwealth Drilling Co., Calgary, Alta., has contract for Command-Globe 5, LSD 15, 15-47-27w3, Saskatchewan section, Lloydminster field.

Halko Drilling Co., Shawnee, Okla., has a good show of oil on a drill-stem test of its wildcat 3 miles east of Prague pool, northeastern Pottawatomie County, Oklahoma. Pay is the Calvin sand and the well is 1 Wells, 12-11n-6e.

Rowan Drilling Co., Fort Worth, has staked location for a 5,700-ft. test to the Clear Fork in the TXL field, Ector County, West Texas. The well is Rowan 6 Parker, S½ NW, Section 40, Block 45, Township 1 south, T&P Survey.

Calvert & Willis, Inc., Olney, Ill., are presently on the following Illinois contracts: J. J. Lynn 2 Houser-Sears, NW NW SE 21-6n-10e, Jasper County; Inland Producers, Inc., 1 G. Harms, a wildcat in SE SE NE 19-1s-14w, Edwards County; and J. J. Lynn 1 Tucker, SW SW NW 26-5s-6e, Hamilton County.

Big Chief Drilling Co., Oklahoma City, will drill a wildcat to the second Wilcox or 7,250 ft. in southern Cleveland County, Oklahoma. The well, the 1 Mager, C SW NW 1-7n-1w, is 8 miles east of Noble and is being supported by Carter Oil Co., Phillips Petroleum Co., Sinclair Prairie Oil Co., Standard Oil Co. of Kansas, and Deep Rock Oil Corp.

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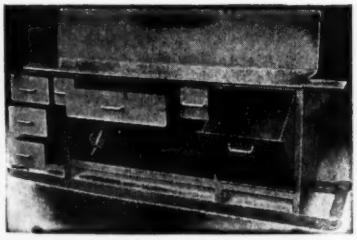

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HOUSTON, TEXAS

Cook Drilling Co., Jackson, Miss., is setting surface pipe on the Carter Oil Co. 1 Herbert Moseley, C NE SW NW 3-10n-3w, Choctaw County, Alabama.

Karels & Federspeil, Regina, Sask., are completing Gateway 1, LSD 14, 35-48-28w3, Lloydsask area, Lloydminster field.

McCurdy Brothers, Denison, Tex., are contractors for a 4,500-ft. wildcat, near the Red River, northwest of Ravenna, Fannin County, Texas. The well is the Allen & McLarry 1 Bible, 3,736 ft. from south and 330 ft. from west line, B. D. Bible farm, Joseph Jeffries Survey.

Regent Drilling Co., Ltd., Vermilion, Alta., is the contractor for three wells at Edgerton, Taber, and Bassano, in Alberta Province. The first two wells are for California Standard Co. and the latter for Globe Dillon Syndicate.

Cactus Drilling Co. has brought in a producer in Winkler County, Texas, flowing 135 bbl. of oil per day through 14/64-in. choke from pay at 3,478 ft. Their well is the 1 Jenkins, Section 6, Block 77, PSL Survey.

Mayfield Drilling Co. is starting a wildcat of its own in the Bellevue area, Bossier Parish, North Louisiana. This test is the 1 Stewart Estate, C NW NE 24-19n-11w, and is drilling for the Cotton Valley sand. Mayfield owns 2,520 acres around the location.

Hewgley Drilling Co., Jackson, Miss., will drill a deep test for Stanolind Oil & Gas Co. in Attala County, Mississippi. Location has been staked and the well is the 1 C. E. Steed, C SE SW 4-13n-6e, 2 miles south and 6 miles west of Kosciusko.

Harbar Drilling Co., Wichita, has brought in a producer in Rooks County, Kansas, for the discovery well of a new field. The well, its 1 Baldwin, C N½ NE SE 9-10s-19w, 1½ miles west of Vohs field, has a state potential of 771 bbl. of oil per day. Production is from the Kansas City lime at 3,446-50 ft.

Guy Mabee Drilling Co., Tulsa, has received contracts for two deep tests in Hale and Lamb counties, Texas. The Hale County test is the Southern Minerals Corp. 1 J. W. Heard, 660 ft. from south and west lines, Section 13, Block R, EL Survey. It is 3 miles north and 1 mile west of the discovery well of Petersburg field. In south Lamb County, Mabee has contracted the Sunray Oil Corp. 1 Algie C. Gipson, southwest corner of League 18, League 685, State Capital Lands Survey. The first test will go to 7,200 ft. or the Cisco section of the Pennsylvanian, and the second will go to 6,500 ft.

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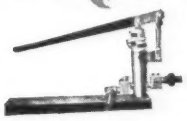

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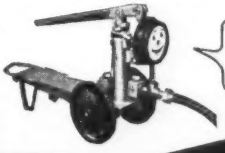

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STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED MAY 31, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	12	6	0	*6	17,444	502	651	0	0	0	0	0	3	0	0	2	5
Pennsylvania	43	20	6	†17	64,973	1,233	1,675	0	0	0	0	0	0	0	0	0	0
West Virginia	9	2	5	2	24,084	312	282	0	0	0	0	0	0	0	1	0	1
Ohio	24	6	11	7	60,516	508	471	0	0	0	0	0	0	0	3	19	22
Indiana	10	4	0	6	19,719	229	130	1	0	0	2	3	7	0	0	19	26
Kentucky	9	4	1	4	16,951	226	181	1	0	0	0	1	6	0	0	20	26
Illinois	24	9	0	15	62,778	750	856	0	0	0	5	5	19	0	0	115	134
Michigan	23	10	3	10	44,078	278	308	0	0	0	5	5	5	0	7	84	96
Kansas	44	26	3	15	142,051	1,015	811	0	0	0	3	3	15	0	9	115	139
Neb., Mo., Iowa	0	0	0	0	0	2	7	0	0	0	0	0	0	0	0	2	2
Oklahoma	59	29	5	25	186,818	1,606	959	5	0	0	8	13	36	2	6	275	319
Texas	137	77	15	45	676,020	3,436	3,327	2	1	1	26	30	119	23	32	515	689
North Central (Dist. 7B & 9)	39	17	1	‡21	108,858	1,059	1,183	0	0	0	8	8	42	0	7	169	218
West (Dist. 7C & 8)	28	20	3	5	178,151	820	686	0	0	0	3	3	11	0	2	64	77
Panhandle (Dist. 10)	8	4	2	2	25,656	174	148	0	0	0	2	2	1	0	1	2	4
Eastern (Dist. 5 & 6)	10	5	5	0	55,893	201	314	0	0	0	0	0	3	0	2	43	48
Gulf Coast (Dist. 3)	29	21	1	7	174,173	642	754	1	1	0	5	7	30	16	13	109	168
Southwest (Dist. 1, 2 & 4)	23	10	3	10	133,289	540	242	1	0	1	8	10	32	7	7	128	174
Louisiana	25	17	2	6	139,144	496	555	1	1	1	4	7	16	9	5	68	98
Northern	15	10	1	4	49,272	251	296	0	1	0	2	3	0	1	1	39	41
Southern	10	7	1	2	89,872	245	259	1	0	1	2	4	16	8	4	29	57
Arkansas	6	3	0	3	21,980	103	73	0	0	0	2	2	0	0	0	20	20
Mississippi	4	4	0	0	36,519	163	98	0	0	0	0	0	0	0	1	31	32
Southeastern States	1	1	0	0	11,578	18	18	0	0	0	0	0	0	0	0	15	15
Montana	6	6	0	0	12,514	74	110	0	0	0	0	0	1	0	0	10	11
Wyoming	10	7	2	1	42,907	89	69	0	0	0	1	1	7	0	2	14	23
Colorado-Utah	7	6	0	1	41,719	69	50	0	0	0	1	1	1	0	0	13	14
New Mexico	8	7	1	0	42,055	205	149	0	0	0	0	0	4	0	1	13	18
California	31	30	1	0	133,374	809	750	1	0	0	7	8	20	0	2	120	142
Total United States	492	274	55	163	1,797,222	12,123	11,530	11	2	2	64	79	259	34	69	1,470	1,832
Total previous week	614	351	78	185	2,179,207	11,631	11,027	15	3	6	69	93	248	32	67	1,406	1,753
Total June 1, 1946	503	258	46	199	1,561,517			13	3	4	61	81	211	25	50	1,304	1,590

Service wells included: *6, †14, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.40	....	....	....
19-19.9	1.45	....	....	....
20-20.9	1.49	$1.55	....	$1.42
21-21.9	1.53	1.57	....	1.44
22-22.9	1.57	1.59	....	1.46
23-23.9	1.60	1.61	....	1.48
24-24.9	1.64	1.63	$1.86	1.50
25-25.9	1.68	1.65	1.88	1.52
26-26.9	1.71	1.67	1.90	1.54
27-27.9	1.75	1.69	1.92	1.56
28-28.9	1.79	1.71	1.94	1.58
29-29.9	1.82	1.73	1.96	1.60
30-30.9	1.86	1.75	1.98	1.62
31-31.9	....	1.77	2.00	1.64
32-32.9	....	1.79	2.02	1.66
33-33.9	....	1.81	2.04	1.68
34-34.9	....	1.83	2.06	1.70
35-35.9	....	1.85	2.08	1.72
36-36.9	....	1.87	2.10	1.74
37-37.9	....	1.89	2.12	1.76
38-38.9	....	1.91	2.14	1.78
39-39.9	....	1.93	2.16	1.80
40 and above	....	1.95	2.18	1.82

*For crude from Laboval, El Campo, and Sandy Point. †Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED MAY 17

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosene	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosene	Gas & dist. oil	Residual
East Coast	835	1,909	263	1,074	1,653	20,943	4,816	9,701	7,021
Appalachian:									
District 1	87	230	34	90	67	2,421	188	408	230
District 2	70	243	21	40	116	1,122	62	112	119
Ind., Ill., Ky.	784	2,612	352	753	1,037	19,299	1,430	2,943	2,381
Okla., Kans., Mo.	417	1,434	199	455	472	8,970	471	1,254	1,017
Inland Texas	180	866	63	112	329	3,856	237	326	620
Texas Gulf Coast	1,160	3,589	636	1,439	1,567	14,843	1,888	6,006	4,808
Louisiana Gulf Cst.	364	961	312	470	448	5,132	979	2,169	1,132
N. La. & Ark.	62	163	41	70	90	1,701	219	453	111
Rocky Mountain:									
New Mexico	11	41	5	10	21	89	15	39	37
Other Rocky Mtn.	139	461	19	166	216	2,940	80	524	615
California	861	2,418	65	839	2,276	16,511	689	11,277	26,408
May 24, 1947	4,970	14,927	2,010	5,518	8,292	97,827	11,074	35,212	44,499
May 17, 1947	4,867	14,522	2,137	5,662	8,217	99,793	10,586	33,844	44,390
May 25, 1946	4,844	14,282	2,006	5,342	8,671	94,679	12,412	33,857	42,905

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 237,702,000 bbl. as of May 24—up 399,000 bbl. One year ago 222,214,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$1.95
Kettleman Hills, California*	1.94
Beauregard Parish	1.90
Illinois Basin	2.07
Pecos County, Texas (Yates)	1.65
Bradford, Pennsylvania	4.05
Eastern Ill. and Western Ind.†	2.07
Tomball, Texas Gulf Coast	2.10

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	May 31 crude oil	B. of M. May demand	May 24 crude oil
Alabama	1,200	1,200	1,050
Arkansas	80,200	79,000	79,750
California	917,000	875,000	924,800
Colorado	39,200	39,000	39,040
Eastern	63,000	65,200	66,000
Florida	1,160	300	475
Illinois	186,400	210,000	185,800
Indiana	17,900	18,000	17,500
Kansas	291,505	275,000	287,900
Kentucky	25,600	29,000	25,200
Louisiana	419,900	411,000	420,500
North Louisiana	103,900	.....	104,500
South Louisiana	316,000	.....	316,000
Michigan	45,700	47,000	45,690
Mississippi	92,550	86,000	91,100
Montana	22,850	24,000	22,840
Nebraska	600	700	600
New Mexico	105,350	102,000	105,350
Oklahoma	388,900	380,000	387,000
Texas	2,226,850	2,120,000	2,226,850
Dist. 1 (Southwest)	21,100	.....	21,100
Dist. 2 (Southwest)	159,160	.....	159,160
Dist. 4 (Southwest)	243,415	.....	243,415
Dist. 3 (Gulf Coast)	485,170	.....	485,170
Dist. 5 (Eastern)	38,360	.....	38,360
Dist. 6 (Eastern)	112,500	.....	112,500
East Texas field	338,000	.....	338,000
Dist. 7C (West)	36,795	.....	36,795
Dist. 8 (West)	530,125	.....	530,125
Dist. 7B (W. Central)	38,200	.....	38,200
Dist. 9 (N. Central)	137,800	.....	137,800
Dist. 10 (Panhandle)	86,225	.....	86,225
Wyoming	114,380	108,000	114,300
Miscellaneous	.....	600	.....
Total United States	*5,040,245	4,871,000	5,041,745

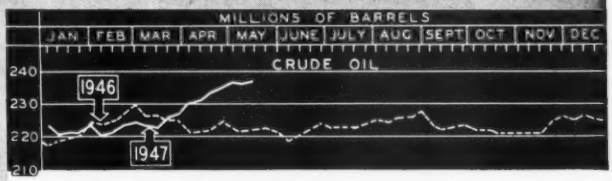
Change from prev. wk., dn. 1,500

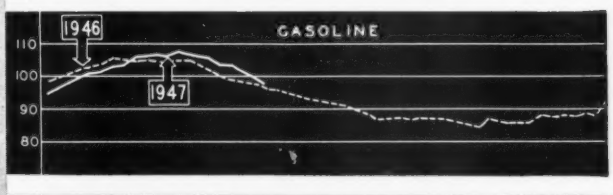
Total production January 1-May 31 ..... †735,834,170 bbl.

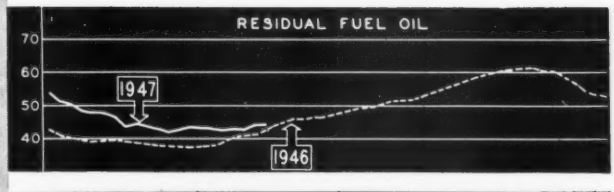
Same period last year (crude plus cond.) 706,672,599 bbl.

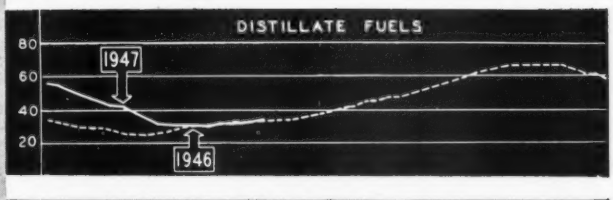
*Not incl. 34,450 bbl. condensate. †Incl. 4,215,150 bbl. condensate.

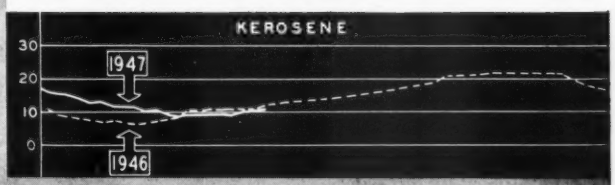
OIL STOCKS IN THE UNITED STATES



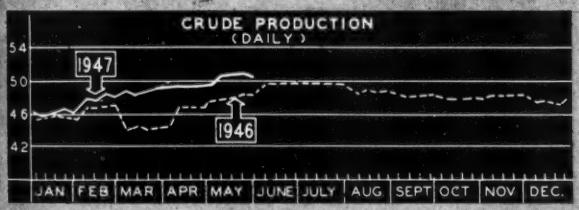


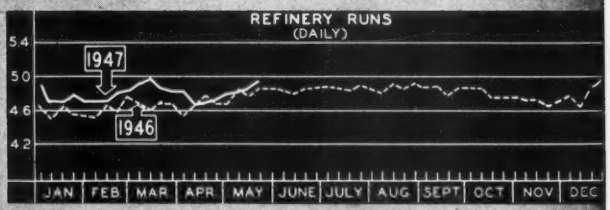




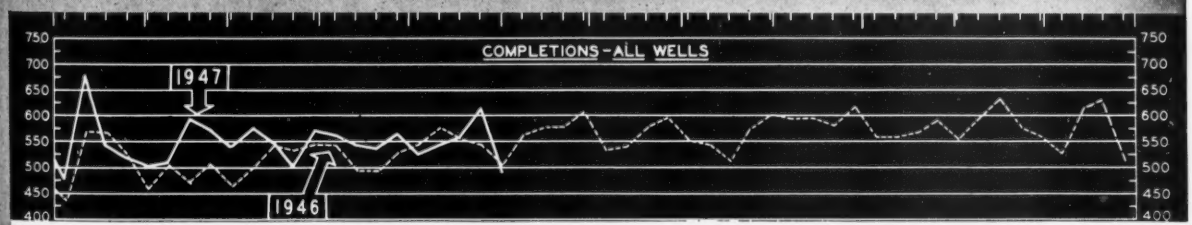


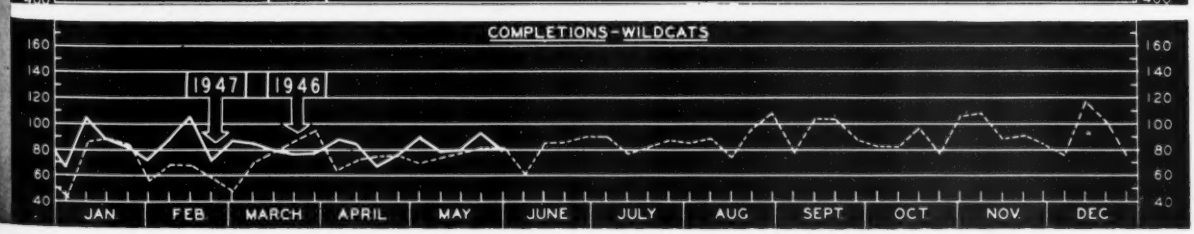
DAILY OPERATIONS





Solid line charts weekly completions, service wells in Eastern area included.





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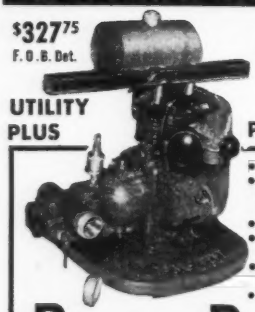

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- PLACER MINING
- TESTING WATER MAINS
- STAKE JETTING BY FISHERMEN
- OIL WELL SURVEY

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MARKETS

PREDICTIONS of a shortage of burning oils this winter, continued firm prices for all products for the remainder of this year, and of another increase in crude prices in the near future were heard in Mid-Continent petroleum-marketing circles during the past week.

Burning oils were reported "as tight as they were during last year's cold weather" by one refiner. Premiums were reported being offered on No. 2, which was in unusually short supply, and reports indicated better grades of the product were being resold for use as diesel fuel.

Answers from marketers to a petroleum-supply questionnaire sent out by the Individually Branded Petroleum Association indicated marketers are particularly concerned over the fuel-oil outlook for the approaching heating season.

Fuel-Oil Outlook 'Bleak'

A committee spokesman of the association declared the fuel-oil situation "looks extremely bleak" and said many marketers said they believe the "petroleum industry will sustain a black mark on its reputation for not bringing the facts of a possible shortage of burning oils to the attention of the public." "Oil burners," he said, "continue to be installed in great number with every chance fuel for them will not always be available the next heating season."

Marketer returns to the survey indicated, he said, that spot shortages generally are becoming more acute.

Gasoline was reported particularly tight with "some hoarding against the summer shortage" reported. Refiners reported a decided trend among motorists, shifting from Ethyl to regular-grade gasoline. Third-grade material was reported unavailable at the posted price of 7¼.

Heavy fuel oil continued to command a wide spread in price, with suppliers indicating that tank cars are "beginning to control the price" of the product. Heavy shipments were made during the past month, with the result that tank cars were not again available as yet for further shipments.

New York Price Increase

Price of No. 6 was raised 10 cents a barrel at New York Harbor by Mexican Petroleum Corp., a Pan American Petroleum & Transport Corp. subsidiary. Two small suppliers immediately followed the price advance, but major operators were undecided on a change in price. Prices for other products in New York Harbor were reported firm at posted levels, with no spot sales.

One major refiner, summing up the unusual 1947 market and the strong demand for all products, said it was "the first time I've ever been unable to buy gasoline in the winter and kerosene in the summer." Suppliers generally were agreed there will be no decline in products prices during the remainder of the year.

In New York Monday, David L. Barrett, Standard Oil Co. of New Jersey, told the National Association of Purchasing Agents that the fuel-oil shortage may be expected to continue for 2 years. Barrett said the shortage would not be corrected until the industry completes the facilities it was prohibited from building during the war. Current expansion programs are expected to have little effect upon supply within the next 2 years.

Representative Quotations

Representative spot-market quotations of leading suppliers as of last Monday. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel.

GASOLINE, KEROSENE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	8-8.5	10.1-10.4* 9.2-9.4†	8.5-8.75
Premium gasoline, 78-80 octane	8.75-9.5	10.2-12	9-9.5
42-44 w.w. kerosene	6.875-7.25	7.8	6.875-7.125
No. 2 straw fuel oil	6.125-6.625	6.8-6.9	5.75-6
No. 6 residual	$1.79-2.45	$2.32	$1.80-2.00

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.375	4.875	5.125
Grade 18-55	6.45	5.85	6.15

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11-12.5
750 vis., No. 3-4 neutral	13-15.25
2,000 No. 5-6 neutral	14.5-16.75

LUBRICATING OILS

Mid-Continent

150-160 vis. D bright stock, 0-10 p.p.	29
200 vis. No. 3 neutral, 0-10 p.p.	18-20

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	39-40
180 vis. 0 p.t. neutral	48

CRUDE-SCALE WAX

130-132 A.S.T.M. melting point	7.75

Equipment Men in the News

IVAN F. BAKER

Ivan F. Baker has been elected vice president of Westinghouse Electric International Co. Baker has been treasurer of the company since September 1945, a post he retains along with that of director of the company. Since 1937, he has filled various posts in the sales department in the New York headquarters of the company, including industry sales manager and sales manager, until his election as treasurer in 1945.

Emmett A. Williams has been appointed vice president in charge of operations, and **I. E. Cox** has been named vice president in charge of engineering of the National Bearing Division of the American Brake Shoe Co.

John R. McGuire has been appointed sales manager of Waterman Engineering Co., Evanston, Ill.

Robert L. Schroy has been appointed to direct sales activities of Columbia Rubber Co., Ravenna, Ohio, a division of The U. S. Stoneware Co.

M. L. (Jack) Cunningham has recently joined the staff of Standco Brake Lining Co., 2701 Clinton Drive, Houston, bringing with him 19 years' experience as drilling and cementing engineer with Gulf Oil Corp., Humble Oil & Refining Co., Halliburton Oil Well Cementing Co., Dowell Incorporated, and others. Cunningham will coordinate Standco sales and service among supply houses, drilling contractors, and rigs.

General American Transportation Corp., Chicago, has acquired The L. R. Christie Co., New York City, well-known builders of industrial dryers, calcinators, and coolers.

Joseph C. Edler, until recently with Atlas Imperial Diesel Engine Co., has been appointed sales engineer with Superior Engine Division of The National Supply Co. with headquarters in Chicago. Edler will represent the company in Wisconsin, Illinois, the lower peninsula of Michigan, parts of Pennsylvania, New York, and Ohio.

Floyd Jones has been named sales manager of the portable compressor division of Davey Compressor Co., Kent, Ohio. For the past 2 years he has been the northeastern district manager in charge of New York, New England, and southeastern Canadian territories.

Anthony M. Kohler and **Alan E. Phin** have been elected vice presidents of Babcock & Wilcox Co. by the board of directors.

H. Cliff Corwin has been appointed sales manager of White Engineering & Manufacturing Co., Inc., Rochelle Park, N. J., manufacturers of portable vapor steam cleaning machines.

L. J. Amsdell has been promoted to eastern sales manager of Acme Rubber Manufacturing Co., Trenton, N. J. He will make his headquarters at the company's New York offices in the Woolworth Building. Amsdell was formerly western sales manager in Chicago.

John W. Peterson, advertising and sales promotion manager of Climax Industries, Inc.'s, three manufacturing plants, located in Clinton, Tulsa, and Chicago, has announced the formation of The Peterson Advertising Agency with offices located at Clinton, Iowa.

M. W. Reed has been elected vice president in charge of engineering of Carnegie-Illinois Steel Corp. He has been chief engineer of the company since March 1, 1939. Previously he was vice president in charge of operations of American Steel & Wire Co., another U. S. Steel subsidiary.

C. L. Cummins, founder in 1919 of Cummins Engine Co., Inc., Columbus, Ind., was elected chairman of the board of directors, and **J. I. Miller** was elected president of the company at the 1947 annual meeting of stockholders and directors.

Ladish Co., Cudahy, Wis., has announced establishment of a new district office in Atlanta, and the discontinuation of its New Orleans office. The new office will be located at 452 Spring Street, N.W., and will serve the southeastern territory. **W. W. Bowie,** formerly manager of the New Orleans office, has been appointed manager of the Atlanta office.

Arthur F. Woods has been appointed district sales manager of The Yale & Towne Manufacturing Co., Stamford Division, to direct Tri-Rotor pump sales in Michigan, Ohio, Indiana, Kentucky, West Virginia, and western Pennsylvania. Wood's headquarters will be in Detroit.

Olaf Haug has been named Borg-Warner International Corp.'s automotive representative in Continental Europe and Scandinavia. He will maintain headquarters in Oslo. **William Mohr** has been appointed the corporation's regional manager in the Caribbean zone. Mohr currently is visiting offices and plants of Borg-Warner Corp. in the United States before proceeding to this territory.

White Motor Co. announces a new location in the metropolitan region of New York City at 650 Eleventh Avenue.

D. J. MEEHAN

D. J. (Don) Meehan has recently reopened Norvell-Wilder Supply Co.'s offices in the McBirney Building, Tulsa. The offices had previously been closed for almost a year following the decease of A. C. Evans who had formerly managed the Tulsa office. Meehan attended Manhattan College and Fordham University and also attended courses at Pate Institute. He was with Babcock & Wilcox Co. for 2 years and later with M. H. Treadwell Engineering Co. Before the war he was employed by Lummus Co. and then managed the Beaumont, Tex., office of Bethlehem Supply Co.

Dr. Lester A. Pratt, of Winchester, Mass., general sales manager of Monsanto Chemical Co.'s Merrimac division, has been appointed assistant to division general manager, **Josiah B. Rutter.** The appointment coincides with the naming of Pratt by

Continental Supply Co. held a 2-day sales meeting of the West and North Texas and New Mexico district key personnel on May 12 and 13 at the Blackstone Hotel, Fort Worth. With R. L. Collier, district manager, in charge, the 28 district men were addressed by F. I. Brinegar, executive vice president, N. A. Endicott, sales manager, and J. A. Mussler, manager of tubular sales, all of Dallas

trustees as president, general manager, and trustee of New England Alcohol Co., a Monsanto subsidiary at the Everett, Mass., plant.

Ampco Metal, Inc., announces the appointment of J. B. Ripley Brass Foundry of Windsor, Vt., as licensee in that area.

C. B. BRIGGS, JR.

Charles B. Briggs, Jr. has been appointed production manager of the Kansas City, Kans., plant of The Marley Co., Inc., manufacturers of cooling towers, nozzles, and other water-cooling equipment. Briggs, who has been with Marley since September 1944, as application engineer and public-relations director, succeeds **E. A. Ostram** who is now manager of the Marley Stockton plant.

F. A. Abbiati, general manager of sales for Monsanto Chemical Co.'s plastics division, with headquarters in St. Louis, has been appointed assistant general manager of the division. Abbiati is to be succeeded as general manager of sales by **James R. Turnbull**, who, up to now, has been assistant general manager of sales. Turnbull, in turn, will be succeeded by **Charles Lichtenberg.** Other changes announced by Williams are **Robert K. Mueller**, plant manager, East Plant, becomes production manager; **Kenneth M. Irey**, plant manager, West Plant, becomes plant manager of both the East and West plants; and **W. T. Dickens** becomes assistant plant manager of both plants.

John B. Hulse, secretary-manager, Truck-Trailer Manufacturers Association, departed from Washington, D. C., headquarters recently for a tour of visits with trailer builders and suppliers which is expected to consume a fortnight and take him into at least four major western and Pacific Coast cities.

Homer Parsons has been appointed director of exports for American Brake Shoe Co.

George H. Clark, vice president in charge of engineering of The Formica Insulation Co., Cincinnati, is the new president of the Society of the Plastics Industry.

William T. Gossett, vice president and general counsel of Ford Motor Co., Detroit, has been named a director of the company. The directorate is made up of **Henry Ford, II; Benson Ford; E. R. Breech; M. L. Bricker; J. R. Davis; B. J. Craig;** and Gossett. **C. J. Fournier** has been appointed manager of the company's parts and service department for the Southwestern region. He will transfer to his new job immediately, and will make his headquarters at the southwestern region office, Kansas City, Mo.

Vernon S. Anderson of Libertyville, Ill., has been appointed a communications field engineer for Motorola, Inc. Anderson will have the northern Illinois territory.

John E. Kirkpatrick of Oklahoma City, and **W. F. Gibson** of Pampa, Tex., have organized the Gibson Well Service Co., with headquarters at Pampa.

L. C. Grimshaw has been appointed metalurgical engineer of Clad Products Division of Jessop Steel Co., Washington, Pa. He will assist in the development, manufacture, and application of composite metals, including stainless-clad steel.

George M. Schurman, president and treasurer of National Bag Corp. since 1930, has been elected a director of American Brake Shoe Co. at a meeting of the company's board of directors.

Rapid growth of industry throughout the Southwest has resulted in a further expansion of the Houston office of Minneapolis-Honeywell Regulator Co. The Houston office serves as regional headquarters for the firm and supervises operations through a large territory covering the Gulf Coast of Texas, Louisiana, part of Mississippi, northern Texas, southern Arkansas, Oklahoma, and southern Kansas. **R. L. Mallory** is regional manager.

Liquid Conditioning Corp., Linden, N. J., announces the appointment of L. S. Luther & Co. as engineering sales and service representatives in the District of Columbia, most of Virginia, and most of Maryland. Headquarters of L. S. Luther & Co. are at 1018 Eighteenth Street, N.W., Washington, D. C.

F. S. Darke and **W. C. Schloskey**, Rollway Bearing Co., Inc., representatives in Chicago, have occupied new headquarters in the Civic Opera Building, 20 North Wacker Drive.

F. O. Wilson, Jr., has been appointed Elliott Co. Cincinnati district manager.

J. Lester Perry, assistant to **Benjamin F. Fairless**, president of the United States Steel Corp. of Delaware, has been elected president of Columbia Steel Co., U. S. Steel's West Coast subsidiary, succeeding the late William A. Ross, who died in San Francisco on April 19, 1947.

Roland F. Lough, the technical service engineer of Oakite Products, Inc., who formulated and directed that company's activities in the petroleum field, has resigned in order to establish his own company. Lough and his associates will offer a bottoms-reclamation and sludge-removal service to the industry using new developments of a patented nature covering chemicals and mechanical equipment.

Robert R. Walker has been appointed Pittsburgh district manager for U. S. Royal tires. Walker, who joined the company in 1939, has been manager of commercial sales in Pittsburgh since last year.

E. B. "Ernie" Snell, with Bovaird Supply Co. before the war, has joined General Oil Field Supply, Inc., as district representative at Wichita.

James S. Knowlson, president and chairman of the board, presided over the recent annual meeting of stockholders of Stewart-Warner Corp. A new director, **Thomas H. Beacom**, Winnetka, Ill., was elected to the board. Vice president in charge of trust department of The First National Bank of Chicago, he fills the vacancy caused by the retirement because of failing health of **Robert J. Dunham.** All other incumbent directors were reelected. They are **Irving S. Florsheim, Charles F. Glore, Frank A. Hiter, James S. Knowlson, William A. Patterson** and **Ralph M. Shaw.**

Vincent J. Calise has joined Liquid Conditioning Corp., Linden, N. J., in the capacity of technical manager.

Refrigeration Engineering Corp. announces the opening of new sales display rooms and general offices at 2024 Market Street, Philadelphia. Warehousing activities continue to be centered in Camden and coolers are manufactured at Huntington and Camden. A complete refrigeration system will be on demonstration at the display rooms in addition to many other items being sold by the firm.

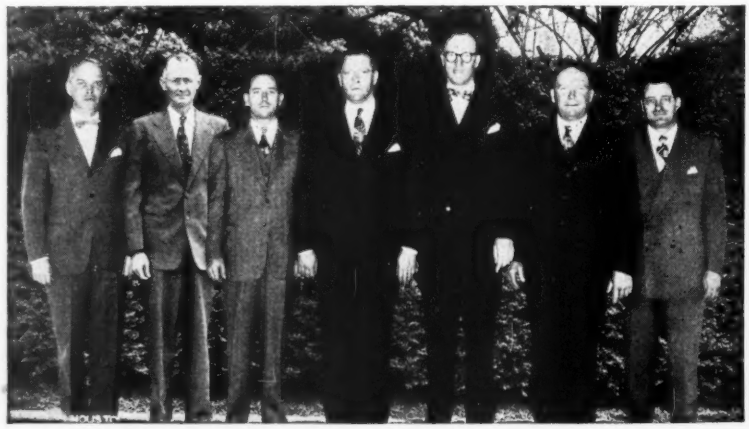
Dave S. Ferree was recently appointed district manager of the new Philadelphia sales office of Falk Corp.

George M. Conner, former assistant parts manager of the diesel-engine division of Stewart & Stevenson Services, Houston, has been promoted to parts manager of the Houston plant. Conner has been with Stewart & Stevenson for 3 years.

Ethyl Corp. has assigned four automobile engineers from its research laboratories to work with the research laboratories of the petroleum industries for the purpose of effecting closer cooperative technical studies in the field. Each of the four has been appointed to serve in one of the four sales regions of the company. They are: **Benjamin Brewster**, eastern region; **Charles B. Kass**, central region; **Richard B. Sneed**, southern region; and **Gilbert Way**, western region.

Henry Rowold has been named assistant general sales manager of Mack-International Motor Truck Corp. Rowold also a vice president of the company, combines his new duties with those of national accounts manager, a position he has held for some time.

Robert A. Neal, vice president of Westinghouse Electric Corp., has been named general manager of the company's expanding Pacific Coast operations. Appointment of a chief executive officer for the Pacific Coast, reporting directly to the president, is dictated by expansion of the company's operations there and involves no change in the personnel or duties of those now in the company's employ in that section. Westinghouse at present is completing lease arrangements to operate the Sunnyvale, Calif., plant of the Joshua Hendy Iron Works. Other West Coast Westinghouse plants are located at Los Angeles and Emeryville, Calif., Portland, Ore, and Seattle, Wash.



Officers and directors of Oil Center Tool Co., Houston, met recently to plan a celebration in August in observation of its twentieth anniversary. Shown here are: B. V. Fisher, A. J. Penick, J. E. Edwards, C. B. White, J. F. Maher, Fritz Richards, and J. E. Eckel

James Moon and **B. P. Bayliss,** formerly with Western Oil Tool & Engineering Co., and **Dave Smith,** formerly with Western Gear Works, have recently joined the staff of Waldrip Engineering Co. These men bring to the company a fund of information gained by many years experience in the petroleum and associated industries.

Dr. Claude C. Peavy has been named chief engineer of Houdry Process Corp. At the same time, **Harmon J. Monnik** was made chief of the mechanical engineering department. **William C. Dickerman** will be in charge of process design.

G. A. Tompson, vice president, and **R. G. Ayers,** general manager of sales, of Bethlehem Supply Co., have just returned to Tulsa from a trip to the West Coast where they attended the annual meeting of the Petroleum Equipment Suppliers Association at San Francisco. They extended their trip to include a visit with the Bethlehem Supply Co. of California in Los Angeles and to call on the trade.

L. A. Hamilton. formerly assistant manager of Air Reduction Sales Co.'s Seattle district, has been appointed manager of that district. The Seattle district embraces practically the entire State of Washington, the northern part of Idaho, and the State of Montana. **Emmett W. MacCorkle, Jr.,** has been appointed Airco's Portland district manager. The Portland district encompasses the entire State of Oregon, the southern half of Idaho, and a part of the State of Washington in the vicinity of Walla Walla. **Herman Van Fleet, Jr.,** has been appointed manager of the New England district, encompassing the states of Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and the eastern third of Connecticut. Van Fleet's headquarters will be at 122 Mount Vernon Street, Boston.

ROY W. MAZE

Roy W. Maze has been appointed public relations director of The Marley Co., Inc., manufacturers of nozzles, cooling towers, and other water-cooling equipment. Maze entered the company in November 1946, and succeeds **Charles B. Briggs, Jr.,** who is now production manager of the Kansas City, Kans., plant.

James A. Reynolds has been transferred from Minneapolis-Honeywell Regulator Co.'s Seattle office to serve as branch manager of a new office in Butte, Mont. Cities included in the new Butte office are Helena, Missoula, Bozeman, Anaconda, Cut Bank, and Whelby.

Exploration Surveys, Inc., announces the removal of its offices to 6000 Lemmon Avenue, Dallas.

Samuel N. Pickard, president of National Manufacturers Bank, of Neenah, Wis., has been elected a director of the Four Wheel Drive Auto Co. Pickard replaces Antone Kuckuk, of Ahawano, Wis., who died October 4 and who had been a member of the board since 1914. His term on the board of directors will run until the next annual stockholders' meeting.

Lee K. Kinney has been appointed distribution manager for The Liquid Carbonic Corp. to succeed **Frank B. Andrews,** who recently was appointed production manager of Bottlers' Machinery Division. **Dr. Reginald M. Jones** is the head of a newly organized research division. The reorganization of the corporation's research activities includes the work of three laboratories. The control laboratory, under the supervision of **Everett W. Ellicson,** handles problems of extract production, and bottlers' problems including spoilage, sanitation, and water analysis. The research laboratory, under **Ralph Rose,** deals with all chemical-engineering development in improving products, methods, and product uses for the company and its customers. The industrial laboratory, under **Robert Matthei,** has as its assignment the work formerly under the technical-sales division.

Albert H. Mayo, with wide experience in gasoline-plant construction and petroleum supply, has joined Oil Well Supply Co. as district engineer, refinery sales, with headquarters in Tulsa, succeeding the late J. W. Koontz. **Roy F. Shaner,** manager of the Wewoka, Okla., store since November 1945, has been transferred to Oklahoma City as assistant district engineer. **Joe F. Daves,** manager of the Madill, Okla., store since December 1, 1941, has been named manager of the new Pauls Valley, Okla., store. In Texas, **Grover S. King,** store manager at Abilene since November 1, 1946, has been appointed manager of the Greggton store, succeeding **O. O. Beasley,** resigned. King, who has also served with stores at Albany and Anson, is succeeded at Abilene by **Stewart M. Miller** of the Greggton store. Miller previously was connected with stores at Albany, Talco, and Eldorado, Ark.

J. F. Berger has been appointed assistant sales manager, Woven Wire Fabrics Division, John A. Roebling's Sons Co. The appointment of Berger is coincident with a program of expansion in both machinery and products for the division. This expansion is part of Roebling's $6,000,000 investment in modernization and enlargement of production facilities.

Flint Steel Corp. has been selected as the new business name to replace Tulsa Boiler & Machinery Co. of Tulsa. In announcing the new name, **Charles W. Flint,** president, emphasizes this change applies to the name only, and will not affect the ownership, management, personnel, or operating policies of the company. The company's fabricating plant occupies over 130,000 sq. ft. of floor space, with 26,000 sq. ft. under craneway for material storage on 16 acres of ground at the intersection of Twenty-first Street and Union Avenue. Export office is maintained at Room 1940, 30 Rockefeller Plaza, New York City. Flint, in addition to being president of the company since 1931, is also president and principal owner of Tulsa Rig, Reel & Manufacturing Co.; American Steel Derrick Co.; Flint Rig Co.; and Flint Industries of Venezuela.

The news service of Caterpillar Tractor Co., formerly a division of the advertising department, has been combined with the sales-publications division of the general sales department, under the direction of **Burt Powell,** sales publications manager. Other members of the service are: **Wendell J. Farischon,** news writer; **Jerry Reichart,** news editor; **Fred J. Tuerk,** and **J. C. MacMillan,** news writers.

Carl J. Linxweiler has been appointed sales manager of Threadwell Tap & Die Co., Greenfield, Mass. Linxweiler previously had been sales manager of the machine-tool division of Sheffield Corp., Dayton, of which Threadwell Tap & Die Co. is a wholly owned subsidiary.

Mid-Continent Supply Co., Fort Worth, announces the opening of the following stores: Great Bend, Kans., with **V. H. Haston,** store manager, and **Paul K. Confer,** field salesman; New Iberia, La., with **W. R. Shuffield,** store manager, and **H. M. LeCompte,** field salesman; Brookhaven, Miss., with **W. M. Day,** store manager, and **C. R. Lowry,** field salesman; and Pauls Valley, Okla., with **Paul Myers,** store manager, and **D. B. Afflack,** field salesman.

In recognition of 20 years of association with The B. F. Goodrich Co., Republic Supply Co. has been awarded a service award plaque. The award was presented to **A. B. Judd** of Republic Supply Co. by **D. R. Anderson,** Goodrich district manager.

JOHN ECKEL

John Eckel, vice president in charge of engineering for Oil Center Tool Co., Houston, will leave early in June for an extended tour of South American oil operations. Eckel plans to spend about 1 month in the Lake Maracaibo area. He will then join **Val R. Wittich,** export representative for the company, in Caracas and visit Eastern Venezuela, Colombia, and other active areas.

A. F. Bauerback has been promoted from assistant manager to manager of the Ford Motor Co.'s Dearborn district. He succeeds **J. C. (Larry) Doyle,** who was recently named central regional manager.

Rushton L. Ardrey, vice president of Republic Bank of Dallas, has been elected one of 12 directors of the Bankers Association for Foreign Trade.

W. A. Thompson, Jr., general partner of Petroleum Maintenance Co., engineers and contractors, Long Beach, Calif., and associates left for Mexico City via Pan American Airways on May 26. In this city they will negotiate with the Mexican Government for the construction of several contemplated projects. They will then leave for Nicaragua where Thompson will inspect his construction program in that country. He is also going to Puerto Cortez, Honduras, to inspect the site of another project which will be under construction this summer and will then leave for Balboa in the Canal Zone to open offices in that city.

Commercial Iron Works, 2424 Porter Street, Los Angeles, announces the appointment of Gordon Z. Greene Co., 2317 East Eighth Street, as representatives in the California territory for a complete line of orifice fittings.

W. C. Philley, manager of Oil Well Supply Co.'s Wichita Falls store since January 1946, has been appointed division credit manager for the U. S. Steel subsidiary's Gulf Coast division. Philley succeeds **J. W. Turner,** resigned.

Ernest E. Hitt, native of Trousdale, Okla., has been appointed manager of the Denver City, Tex., store of Oil Well Supply Co. Hitt succeeds **B. I. Castle,** who has assumed the duties of field representative at Odessa.

Kempton Dunn was elected secretary of the American Brake Shoe Co. at a recent meeting of the board of directors. **Sumner T. McCall,** vice president and secretary, retires from active service on June 1. Associated with the company since 1910, he has held the positions of treasurer, secretary, and vice president. **Cyrus E. Brush** was elected an assistant secretary of the company to serve with **Samuel S. Drury, Jr.,** also an assistant secretary.

R. W. Kerr, formerly vice president and treasurer of Plomb Tool Co., Los Angeles, was made executive vice president at the latest meeting of the board of directors. **H. C. Baumgartner,** formerly secretary and comptroller, was made secretary and treasurer. Other officerships confirmed at the meeting include: **M. M. Mautner,** vice president in charge of industrial relations; **C. W. Coslow,** vice president in charge of manufacturing; **F. G. Robbins,** vice president in charge of research and development; and **J. P. Danielson,** vice president in charge of the J. P. Danielson Division.

Classified Advertising

The Market Place for the Oil Industry

EQUIPMENT FOR SALE

FOR SALE: Failing "36" shot-hole drill with drill rod, water truck and contract. Box B-762, The Oil and Gas Journal, Tulsa, Oklahoma.

2 CARDWELL H Units, Mast, Tools, Truck and Pickup. Complete list. Write: B. J. Murray, 419 N. Terrace Drive, Wichita, Kansas.

FOR SALE: Used 10 inch and 12 inch line pipe with ¼" wall. Utility & Industrial Supply Company, 921 Michigan Ave. E., Jackson, Michigan.

FOR SALE: New 3" and 4" Drill Pipe with Tool Joints standard weights R-2. Box B-734, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—ATTRACTIVE prices—New Master Generator Units direct connected to Wisconsin engines. 1½ to 5 KW A. C. Sgl. Phase & 5 KW D.C. The National Supply Co., Tulsa, Oklahoma.

CALCO'S ARMCO STEEL PORTABLE PIPE RAINMAKER OVERHEAD IRRIGATION SYSTEM, makes you independent of rainfall. The **best crop insurance** you can have including tame pasture, orchards and gardens. Shipment within 30 days. Call or write: C. E. PLOTT, IRRIGATION, 513 Petroleum Bldg., Chickasha, Oklahoma.

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VICTORY SUPPLY COMPANY

Phone 5-2073 **P.O. Box 754**

Tulsa, Oklahoma

NEW MATERIAL FOR SALE

25—6" x 25' Submarine & Cargo Hose fitted with 2 Steel Built-in Nipples and 2 series 15 Forged Steel Welded Flanges Faced and Drilled at $55.00 each.

35—4" x 25' Submarine and Barge Hose equipped with Bronze Male and Female Couplings at $35.00 each.

24—8" x 13½" 150#, Black, Weld Type Steel Flanges at $7.00 each.

36—6" Standard Weld Type Tees at $12.50 each.

8—6" 500# Semi-Steel Wheatley Flanged Gate Valves at $65.00 each.

Several hundred 6" Victaulic Type and Rola Grip Couplings at 50% discount.

Large stock of Flanges, Fittings, Gaskets, and a Water Purification System at greatly reduced prices.

WIRE OR WRITE

ATLAS SUPPLY COMPANY

P. O. BOX 1331

BAKERSFIELD, CALIFORNIA

EQUIPMENT FOR SALE

FOR SALE at Chase, Kansas. One used Allis-Chalmers Model "UEL" Skid Servicing Winch, Price $2,000. Cities Service Oil, Patridge, Bartlesville.

FOR SALE: All kinds of atmospheric coolers, Tulsa, Coynoco and GR, all in first class condition. ENGLE PETROLEUM, INCORPORATED, P. O. Box 72, Mt. Carmel, Illinois.

FOR SALE: Allis Chalmers Model-52 single drum skid winch with L-90 motor. Motor, clutch and transmission just completely overhauled. Priced for quick sale and located in West Texas. Write or wire Box B-738, The Oil and Gas Journal, Tulsa, Oklahoma.

Model 200 Sullivan Drill mounted on 1941 tandem White truck, complete with all drilling accessories, 1800 ft. 2⅞ in. drill pipe, 5 x 8 Gardner-Denver Pump, Kohler light plant, etc. Purchased new in May 1945. Never drilled below 1500 ft. Located at Grandfalls, Texas. Write Box 1022, or call 813 Del Rio, Texas.

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STEEL STORAGE TANKS

38—10,000 Gallon Capacity Tank Car Tanks

CLEANED PAINTED TESTED

Located in Oklahoma

IRON & STEEL PRODUCTS, INC.

42 years' experience

13412 S. Brainard Avenue

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"ANYTHING containing IRON or STEEL"

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary, chain pull down, smallest pump size is 4 x 6 Condition of same is excellent, others are in need of repair. Price F.O.B. Dallas is from $3,000 to $8,000 with truck. For details write:

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Dallas, Texas

LATEST TYPE

DIESEL AIR COMPRESSOR

300 H.P.

Clark Right Angle Model D32, 3 Cylinder 14" bore 14" stroke Air End 21" and 12½". Complete with all equipment, wrenches, etc. Machine operated only three months in Clarks Dresser Plant at Bradford. Now located near Bradford, Penna. Crated for immediate shipment.

PRICE ONE HALF OF PRESENT QUOTATION

ADDRESS:

NORTHERN ORDNANCE INCORPORATED

W. M. Cordner—Sales Manager

Minneapolis, Minnesota **Telephone: Granville 7201**

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